PROTECCION TECNICA ECOLOGICA (PROTECO) INC.
PART B PERMIT APPLICATION
PRD 091018622
PENUELAS, PUERTO RICO

VOLUME II

Fred C. Hart Associates, Inc.

523684

SECTION E - GROUNWATER MONITORING PLAN

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SECTION E

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INSERT A

I. INTRODUCTION

This document was prepared in accordance with the requirements set forth by the United States Environmental Protection Agency (USEPA) and the Puerto Rico Environmental Quality Board (EQB), pursuant to the Resource Conservation and Recovery Act (RCRA). This document was specifically designed in compliance with paragraphs 265.91 and 265.92 of the Act and describes the Groundwater Monitoring Program and Sampling and Analysis Plan for proposed new disposal units for the Proteccion Tecnica Ecologica, Inc. (PROTECO) Facility in Penuelas, Puerto Rico.

The water-bearing zones at PROTECO are not well defined at this time. Lateral extent of the zones needs to be determined. A work plan outlining additional tasks to define the extent of water bearing zones is being prepared and will be submitted by February 11, 1986. For these reasons, the locations of proposed wells in this report are subject to relocation after obtaining more hydrogeologic information.

The primary objective of the PROTECO Groundwater Monitoring Program and Sampling Analysis Plan is to evaluate the impact of individual regulated units on the quality of groundwater underlying the facility. This Groundwater Monitoring Program was developed to monitor the uppermost aquifer or water-bearing geologic unit beneath proposed new regulated units at the facility. This general approach to groundwater monitoring is appropriate because the uppermost water-bearing geologic unit is the most probable route for contaminant migration from individual regulated units. Monitoring of this zone would therefore provide the earliest possible detection of leakage from regulated units.

The PROTECO Groundwater Monitoring Program consists of point of compliance monitoring wells located downgradient from each regulated unit. Regulated unit specific water quality parameters have been established for each existing unit based upon the type of waste(s) expected to be placed in the subject unit. In this way, the groundwater monitoring network in conjunction with procedures described in the Sampling and Analysis Plan, should be capable of detecting leakage from regulated units.

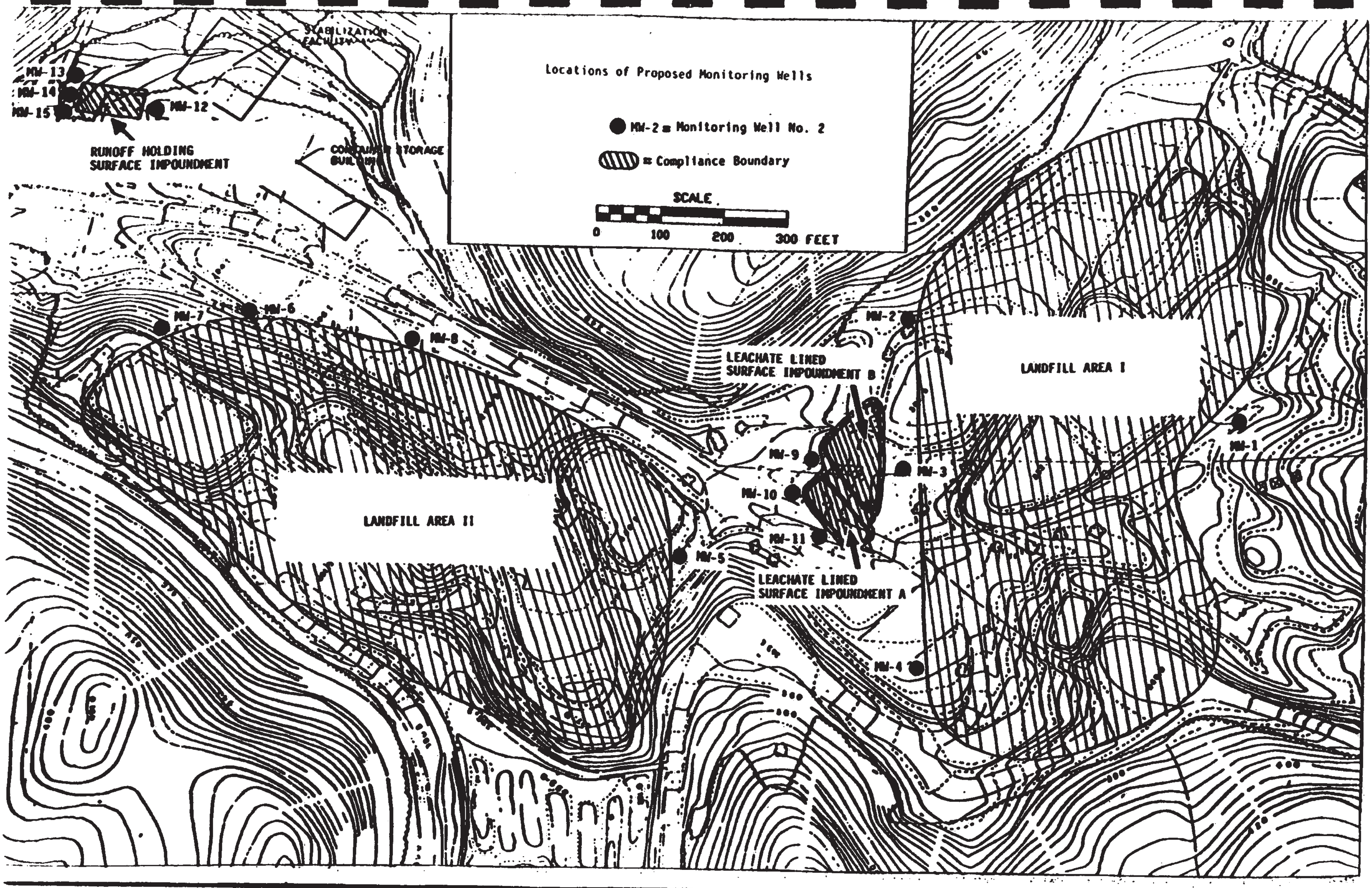
This Groundwater Monitoring Program applies to the monitoring of four (4) proposed regulated units. These are Landfill Area 1, Landfill Area 2, two (2) Leachate Lined Surface Impoundments and a Runoff Holding Surface Impoundment associated with the tank farm storage and treatment facility. The location of these proposed regulated units is illustrated on Figure E-1.

II. DESCRIPTION OF GROUNDWATER MONITORING NETWORK

In accordance with Subpart F - Groundwater Monitoring, paragraph 265.91, the Groundwater Monitoring Network for each regulated unit at the PROTECO facility will consist of three (3) hydraulically downgradient monitoring wells installed at the limit of the waste management area or by definition, the point of compliance. Furthermore, monitoring wells (downgradient and upgradient wells) are located in compliance with paragraph 264.97 to yield groundwater samples from the uppermost water-bearing geologic unit. These samples are representative of the quality of groundwater passing the point of compliance for each regulated unit and representative of background groundwater that has not been affected by leakage from a regulated unit. A description of the groundwater monitoring network for each regulated unit, existing and proposed, is listed below.

Proposed Units:

Landfill Area I:


Locations of Proposed Monitoring Wells
MW-2 = Monitoring Well No. 2
= Compliance Boundary
SCALE
0
100
200
300 FEET
STABILIZATION FACILITY
MW-13
MW-14
MW-15
MW-12
RUNOFF HOLDING
SURFACE IMPOUNDMENT
MW-7
MW-6
MW-8
LANDFILL AREA II
MW-5
MW-9
MW-10
MW-11
MW-2
MW-3
MW-4
MW-1
LEACHATE LINED
SURFACE IMPOUNDMENT B
LEACHATE LINED
SURFACE IMPOUNDMENT A
LANDFILL AREA I

Landfill Areas 1 and 2 will be double lined according to the Minimum Technology Guidance on Double Liner Systems draft generated by the EPA. Each landfill will have its own monitoring network. The individual monitoring networks are described in the following sections.

The groundwater monitoring network for this regulated unit consists of three (3) downgradient point of compliance monitoring wells and one (1) upgradient monitoring well. The proposed location of each monitoring well in this network is illustrated in Figure E-1. Each monitoring well will be completed to yield samples from the uppermost water-bearing geologic unit underlying Landfill Area 2. The downgradient monitoring wells are identified as MW-6, MW-7 and MW-8. The upgradient monitoring well is identified as MW-5. Well construction specifications for each well are described in Section III and a table summarizing the details of construction of each well is presented in Table E-1. Specifications such as elevation, depth and screened interval were estimated based on existing hydrogeologic knowledge of the area and will be updated after well installation.

Leachate Surface Impoundments:

Two (2) lined surface impoundments, Leachate Impoundment A and Leachate Impoundment B have been designed for the storage and treatment of leachate generated from the landfills. The impoundments will be double lined according to the Minimum Technology Guidance on Double Liner Systems EPA draft. Due to space restrictions, the two impoundments will share one monitoring network consisting of three (3) downgradient point of compliance monitoring wells and one (1) upgradient monitoring well. The locations of the impoundments and the proposed monitoring wells are illustrated in Figure E-1. As is made evident by Figure E-1; the two impoundments are in close proximity to one another. Additionally, the sediment basin is located adjacent to the southwestern edge of Leachate Impoundment B, although the sediment basin is not a regluated unit. Dikes access roads will separate the Leachate Impoundments and the sediment basin.

PROPOSED REGULATED UNIT MONITORING WELL SPECIFICATIONS

Well No.	Monitored Unit	Approx. Ele. TOC (FT)	Est. Total Depth (FT)	Est. Screened Internal (FT)	Screen Length (FT)	Slot Size (IN)	Well Diameter (ID)(IN)	Casing Material	Hydrogeologic Position Relative to Regulated Monitored Unit
MW - 1 (I)	Landfill Area I	347	95	85-95	10	0.01	2	Teflon	Upgradient
MW - 2 (I)	Landfill Area I	316	45	35-45	10	0.01	2	Teflon	Downgradient
MW - 3 (I)	Landfill Area I	295	50	40-50	10	0.01	2	Teflon	Downgradient and upgradient for Surface Impoundment
MW - 4 (I)	Landfill Area I	300	60	50-60	10	0.01	2	Teflon	Downgradient
MW - 5 (II)	Landfill Area II	318	70	60-70	10	0.01	2	Teflon	Upgradient
MW - 6 (II)	Landfill Area II	280	45	35-45	10	0.01	2	Teflon	Downgradient
MW - 7 (II)	Landfill Area II	308	70	60-70	10	0.01	2	Teflon	Downgradient
MW - 8 (II)	Landfill Area II	274	50	40-50	10	0.01	2	Teflon	Downgradient
MW - 9	Leachate Surface Impoundment	306	50	40-50	10	0.01	2	Teflon	Dowgradient
MW - 10	Leachate Surface Impoundment	310	50	40-50	10	0.01	2	Teflon	Downgradient
MW - 11	Leachate Surface Impoundment	318	60	50-60	10	0.01	2	Teflon	Upgradient
MW - 12	Runoff Holding Surface Impoundment	280	55	45-55	10	0.01	2	Teflon	Downgradient
MW - 13	Runoff Holding Surface Impoundment	274	55	45-55	10	0.01	2	Teflon	Downgradient
MW - 14	Runoff Holding Surface Impoundment	262	55	45-55	10	0.01	2	Teflon	Downgradient
MW - 15	Runoff Holding Surface Impoundment	258	50	40-50	10	0.01	2	Teflon	

One monitoring network, instead of two was chosen because in order to design two points of compliance monitoring networks downgradient of each Leachate Impoundment, it would be necessary to install some of the monitoring wells in too close proximity to the impoundments, in the way of maintenance roadways. Further, the depth to groundwater compared to the horizontal segregation distance between the units makes unit-specific monitoring technically questionable at best.

Each monitoring well will be completed to yield samples from the uppermost water-bearing geologic unit underlying the leachate impoundments. The downgradient monitoring wells are designated as MW-9, MW-10 and MW-11. The upgradient monitoring well is designated as MW-3. Well construction specifications for each well are described in Section III and a data table summarizing the construction details is presented in Table E-1. Specifications such as elevation, depth and screened interval are estimates based on existing hydrogeologic knowledge of the area and will be updated after well installation.

Runoff Holding Surface Impoundment:

This impoundment has been designed to collect any significant spills that would occur in the tank containment area. The impoundment will be double-lined according to the Minimum Technology Guidance on Double Liner Systems EPA draft. The groundwater monitoring network for this regulated unit consists of three (3) downgradient point of compliance monitoring wells and one (1) upgradient monitoring well. The proposed location of each monitoring well in this network is illustrated in Figure E-1. Each monitoring well will be completed to yield samples from the uppermost water-bearing unit underlying the Runoff Holding Surface Impoundment. The downgradient monitoring wells are identified as MW-13, MW-14 and MW-15. The upgradient monitoring well is identified as MW-12. Well construction specifications for each well are described in Section III and a table summarizing the construction details is presented in Table E-1. Specifications such as elevation, depth and screened interval are estimates based on existing hydrogeologic knowledge of the area and will be updated after installation.

III. MONITORING WELL CONSTRUCTION

Monitoring wells installed as a part of the groundwater monitoring network for each regulated unit have been and will be constructed of 2 inch inside diameter (ID) teflon or PVC riser pipe (threaded flush joint) and 2 inch ID machine slot well screen (Teflon or PVC). To insure the compatibility of monitoring well materials with the types of wastes present in existing and proposed regulated units, all permanent monitoring wells installed for the groundwater monitoring of proposed regulated units will be constructed of teflon well screen and riser pipe. PVC well construction materials will be phased out of service and existing monitoring wells constructed with PVC materials will only be utilized to obtain water level data. The annular space around the well screen will be backfilled with chemically inert sand to a depth two feet above the top of each screen. A two foot bentonite seal will be placed above the sand and the remainder of the annulus will be backfilled to the surface with a mixture of six (6) parts Portland Type I cement to three (3) parts water and one (1) part bentonite. The monitoring well installation will be protected at the surface by the placement of a one (1) foot cement seal at the top of the cement-bentonite slurry to prevent the leakage of fluids from the surface into the annulus and ultimately the monitoring detection zone.

Each monitoring well will be fitted with an outer protective casing with a locking cap to prevent tampering. The protective casing is 4 inch ID steel and is installed to a minimum depth of two feet below the ground surface.

Each monitoring well is to be developed by surging and bailing to clear the well screen of fines and induce groundwater flow into the well. Each monitoring well is to be developed a minimum of two times to insure that each well yields groundwater with a minimum concentration of suspended solids. Diagrams illustrating the construction of existing regulated unit monitoring wells is presented in Appendix E.1

IV. MONITORING PARAMETERS

The Groundwater Monitoring Program For Proposed Facilities is designed to monitor the water quality of the individual regulated units. A list of parameters will be developed as the leachate is produced in the landfills. At this time, the exact wastes to be placed in each of the proposed facilities are not known. For this reason, the following list of general indicator parameters will be monitored until the wastes leachate can be further monitored.

Non-Priority Pollutants - Volatile Organic Compounds

Pesticides - PCB's
Total Organic Carbon (TOC)
Total Petroleum Hydrocarbons
Total Dissolved Solids (TDS)
Total RCRA Metals
pH
Specific Conductance

This list of parameters will be modified when leachate monitoring data is available. The specific parameteres will then be based upon the analyses of samples from the leachate collection system along with consideration of wastes sliced in the unit. The parameters will be selected in order to characterize those contaminants present in the subject wastes which are the most mobile and persistent in the system. A semi-annual review of waste streams and leachate will be conducted and monitoring parameters updated as necessary.

V. SAMPLING AND ANALYTICAL PROCEDURES

GENERAL - The purpose for sampling groundwater monitoring wells at the PROTECO Facility is to collect valid representative groundwater quality data from the geologic materials underlying each regulated unit. In order to accomplish this, a number of steps must be taken to assure proper sample collection and hence the collection of valid comparable data. All samples will be collected and handled in accordance with accepted USEPA Standard procedures, as described below.

All groundwater monitoring wells which are included as part of the monitoring program will be sampled within a short time period (1 day) during each sampling campaign. This will help provide an overall understanding of the groundwater quality throughout the hydrogeologic regime underlying the facility at the time of sampling. When conducting each sampling campaign, work will always begin at the background location and proceed downgradient. This is an added precautionary measure which helps assure that the background sample will not be affected by any materials from the downgradient locations. Protecting the integrity of the background sample is critical because these values will be used to set the standards for comparisons with downgradient values.

DETERMINATION OF WELL EVACUATION REQUIREMENTS - Before any groundwater samples are collected for chemical analysis, great care will be taken to assure that the sample is representative of groundwater quality in the geologic materials in the vicinity of the well, and not of standing water in the well. In order to make such an assurance, each well will be properly prepared prior to sample collection. Preparation involves removing water from the well until all standing water which is present in the well has been evacuated.

The first step of the well evacuation process is to determine the actual volume of standing water that is present in the well. This will be accomplished by solving the following equation:

$$V = 5.88\ D^2\ (Lwc - Ldtw)$$

where: V = Standing Volume of Water in the Well (Gallons)
D = Diameter of the Well Casing (Feet)
Lwc = Total Length of the Well Casing (Feet)
Ldtw = Depth to Water in the Well (Feet)

Once the volume of standing water in each well has been calculated, the total volume of water that must be removed prior to sample collection is determined by multiplying the standing volume by the number of volumes to be evacuated. A minimum of three (3) well volumes will be evacuated prior to sampling, if possible. If three well volumes are not available within a reasonable time period, as many volumes as possible will be evacuated.

In addition to enabling a calculation of the standing volume of water in the well, precise water level measurements (to 0.1 inch accuracy) will provide the necessary information to construct a potentiometric surface contour map. Such a map will indicate both the direction and gradient of groundwater flow, and help define the particular hydrogeologic site conditions existing at the time of sampling. This type of information is very important for comparing the hydrogeologic conditions (i.e. seasonal affects) existing from one quarterly sampling campaign to another, and is necessary when interpreting sampling analysis data.

For the above mentioned reasons, and given the fact that confined conditions with anticipated low horizontal flow gradients are expected at the PROTECO Facility it is very important that precise groundwater elevations be measured. As such, a complete round of water level measurements will be made at the start of each sampling campaign prior to the evacuation of any water. A transistorized water level indicator calibrated in feet will be used w/refined measurements to 0.1 inch obtained manually with a mechanical rule. The depth-to-water measurements will be used to determine 1) the volume of standing water in each of the wells which were described earlier and 2) groundwater flow rate and direction as outlined below. A weighted line will also be used to sound the wells in order to verify the total well depths as listed on Table E-1.

DETERMINATION OF GROUNDWATER FLOW DIRECTION - The most important factor for determining the direction of groundwater flow within a given aquifer, is the gradient of the water table or potentiometric surface. This gradient is interpreted from water level measurements which are taken from the groundwater monitoring wells that are screened within this interval (upper most water bearing geologic unit) below the site. The resulting groundwater elevations, or potentiometric surface, is then plotted on a base map and equipotential lines are drawn, resulting in the construction of a potentiometric surface contour map. The direction of groundwater flow is then indicated as being perpendicular to the equipotential lines in a direction from higher to lower head.

In order to gather the needed groundwater elevation data, it is important to know the elevation, above mean sea level, of the measuring point at each well, and to make precise depth-to-water measurements in each well. The elevation of the top of the casings (TOC) at the PROTECO Facility have been determined by a licensed surveyor to 0.01 foot accuracy. Accurate depth-to-water measurements will be made with a transistorized water level indicator calibrated in feet aided by mechanical rule, measurements to 0.1 inch prior to quarterly well sampling. Once the depth to water in the well has been measured, this value is subtracted from the known elevation of the measuring point at the top of the well casing. The resulting value is the elevation above mean sea level of the water in each well. These values are then used to construct the potentiometric surface map. A potentiometric surface map of this kind will be produced from data collected at the PROTECO Facility and will be updated annually.

DETERMINATION OF GROUNDWATER FLOW RATE - The rate at which groundwater flows through any given geologic material can be estimated by the use of a modified form of Darcy's Law. The resulting equation is as follows:

$$V = \frac{-KI}{n}$$

where: V = the average linear velocity of the groundwater (ft/day)

K = the hydraulic conductivity of the geologic material through which the groundwater is flowing (ft/day)

I = the hydraulic gradient [the difference in height (ft) of the potentiometric surface between the two measuring points, divided by the horizontal distance (ft) between the two measuring points].

n = the effective porosity of the geologic material through which the groundwater is flowing.

Laboratory grain size analyses have been conducted on samples collected during the drilling of test borings at the PROTECO Facility. Such analyses have provided information which is useful in determining a (K) value for the above equation.

The movement of groundwater, its rate as well as direction, is controlled to a large extent by permeability contrasts. Several measurements of the permeability of different lithologies encountered were made during the construction of the test holes. There are two generally accepted techniques for determining permeability. A pump-in test is used for unsaturated deposits in the vadose zone above the water table (Bouwer, 1978, p. 129). A rate-of-rise (or fall) test, also known as a bailer of slug test, is used for saturated deposits below the water table (Freeze, 1979, p. 339; and Bouwer, 1978, p. 113). In-situ tests such as these provide more representative data than laboratory tests of cores because they can be used to evaluate the properties of a greater volume of undisturbed section of material. Pump-in tests require the addition of water to a borehole until a constant rate of inflow results in a constant head build-up in order to be able to calculate permeability.

WELL EVACUATION METHOD - Given the small diameter of the wells and the associated low yield characteristics of each well, the proposed method for well evacuation is manual bailing. Pumping methods are not feasible due to the extremely rapid drawdown rates observed in the monitoring wells. The elimination of introducing pump materials into the wells is helpful in reducing the risk of cross-contamination from inadequate pump decontamination efforts. Manual bailing will be accomplished with the use of a 1 1/2 inch diameter, bottom-loading, teflon bailers with a teflon check valve. Each bailer will be three feet in length and each well will have a dedicated bailer to help prevent cross-contamination between wells.

When bailing a well, an attempt will be made to remove the standing water from the top of the water column to the bottom. In this way, the possibility of any standing water remaining in the well is drastically reduced. Furthermore, bailing will proceed at a rapid enough pace to draw the water down and cause the well to go dry. In order to facilitate this effort, a tripod for lowering and raising the bailer into and out of the well should be utilized. Such apparatus will also help keep the teflon cord clean by coiling it on a spool, rather than on the ground, and reduce the risk of introducing contaminants into the well.

SAMPLE COLLECTION - Once the groundwater monitoring wells have been adequately evacuated, they are ready to be sampled. All groundwater samples will be collected with the same bailer used to evacuate the well from which the samples are obtained. Prior to use for initial evacuation and sampling, each bailer will be prepared and stored in the following manner:

1. Each bailer will be rinsed with tap water.
2. The bailers are then washed with methanol.
3. After being rinsed with acetone, they are allowed to air dry.
4. The bailer will then be rinsed with distilled water and again be allowed to dry.
5. Cleaned bailers will be dedicated to each well. They will be stored in the wells in a manner to prevent cross contamination.

Because the groundwater monitoring wells at the PROTECO Facility are so slow to recover, a considerable amount of time may be allowed to pass between the completion of well evacuation and the commencement of sample collection. For this reason, it is possible that recharged water resting at the top of the water column may go through a slight chemical alteration as a result of contact with air in the well casing. To minimize this effect, where possible three bails of water will be wasted onto the ground before any groundwater samples are retained. Where this is unfeasible due to lack of water, only one bail of water will be wasted. This practice will also tend to rinse out any water which remains in the bailer after well evacuation. A minimum of seven liters should be sampled from each groundwater monitoring well. The groundwater samples are poured from the bailers directly into one liter wide mouth glass and plastic bottles provided by the laboratory. In accordance with current EPA guidance, one of these samples is filtered through a 0.45 um membrane for use in the Total Dissolved Metals Analysis. The sample bottles are sterilized at the laboratory by washing in HNO_3 and then rinsed with distilled water. The samples are preserved at the laboratory within twenty-four hours of sample collection. All sample analyses are performed in the laboratory. A description of the bottle types and preservation requirements for the various parameters are listed in Section IV.

CHAIN-OF-CUSTODY AND SAMPLE SHIPMENT PROCEDURES - Proper chain-of-custody procedures will be followed for all groundwater sample handling from the time of collection through final analyses at the laboratory. These procedures are necessary to insure the integrity of the sample through its various phases of possession transfer. It accomplishes this by providing a mechanism to trace the possession of the sample until the final analyses results have been reported. In order to achieve this, the sample must be in the responsible parties' physical possession and secured in a manner that prevents tampering by unauthorized personnel. A number of mechanisms will be followed to guarantee that the above-mentioned criteria have been met, and include the following elements: (1) sample labels, (2) chain-of-custody seals, (3) a chain-of-custody record form, (4) a sample analysis request sheet, and (5) sample shipment procedures.

1. Sample Labels - Sample labels are very important for identifying where each sample has been collected. The labels will be made from gummed paper and will be filled out and affixed to the bottle in the field just prior to sample collection. It is important that this order be followed for label application, because once the cool groundwater is placed into

the sample bottle, water will begin to condense on the bottle, making it difficult to affix the label at that time. It may also be helpful to cover the label with transparent tape to assure that the label does not come off during sample shipment. The sample label will contain the following information: (1) sample number, (2) the collection date, (3) the name of the collector, and (4) the sampling location (i.e., well number).

2. Chain-of Custody Seals - These seals will be placed over the lid of the coolers containing the samples for shipment to the lab. The seals will be placed in a location where they will have to be broken in order to reach the samples. Each cooler being used to ship samples will have its own seal. The seal should have the collector's signature and the sampling date written on it. It is also important that this seal be placed onto the coolers before the samples leave the custody of the sample collector.

3. Chain-of-Custody Record Form - Chain-of-custody record forms will be filled out for each sample and will accompany the sample as it changes possession. The purpose for maintaining such documentation is to allow a trace to be made of sample possession. A copy of the chain-of-custody record form, showing all the information that will be required on the form, appears as Figure E-2.

4. Sample Analyses Request Sheet - Sample analyses request sheets will be supplied by the laboratory and will serve as the major communication mechanism between the sample collector and the laboratory. They indicate which analyses are required for the samples. There will be at least two copies of each form; one will remain at the lab while the other will be returned to PROTECO and be retained as part of the PROTECO records. A portion of the form will be filled out by the person collecting the sample in the field and will contain information pertaining to sample collection details (i.e., sample number and analysis is requested, sample location, collection date and time, collector's name and phone number, etc.). The remaining portion of the form will be filled out by laboratory personnel and will contain the following information: name of person receiving the sample, laboratory sample number, date of sample receipt and analyses to be performed.

FIGURE E-2

PROTECCION TECNICA ECOLOGICA, INC. (PROTECO)

FIRM DELIVERY

PONCE, PUERTO RICO

CHAIN OF CUSTODY RECORD FOR
GROUNDWATER MONITORING PROGRAM

Lab Sample No. ________
____
____
____
____

Sampling Locations: ________________________________

Collector's Name: ____________________ Telephone: (__) ______
SIGNATURE

Date Sampled: ______________ Time Sampled: ________ hours ______

Field Information: ________________________________
____
____

Sample Receiver:

1. ________________________________
name and address of organization receiving sample

2. ________________________________
3. ________________________________

Chain of Possession:

1. ______________ ______________ ______________
signature title inclusive dates

2. ______________ ______________ ______________
signature title inclusive dates

3. ______________ ______________ ______________
signature title inclusive dates

(0597B-10)

5. Sample Shipment Procedures - As indicated earlier, all samples will be shipped to the laboratory in coolers. The coolers will be packed at the site in a manner which assures safe transport of all sample bottles within. This will be accomplished by packing the properly labeled and filled sample bottles in vermiculite to prevent the bottles from falling over and/or breaking. Ice-filled plastic bags will be placed around the bottles within the vermiculite. Once the samples and the ice have been placed in the coolers, all excess space will be filled with additional vermiculite to hold the bottles in place. The chain-of-custody record forms and sample analyses request forms will be placed inside the coolers. The coolers will then be sealed with heavy-duty tape and fitted with custody seals over the lid. All samples will be delivered to the lab within 20 hours of collection.

Recordkeeping - Thorough and detailed records will be kept of all groundwater monitoring well sampling procedures performed at PROTECO including both well evacuation and sample collection details. This information will primarily be recorded in two places; prepared field work sheets and a field log book. The field work sheet will primarily contain information pertaining to well preparation prior to sample collection. (Note: sample collection details will be kept on the chain-of-custody forms, the analyses request sheets, and in the field log book). This sheet will be filled out in the field to allow for a determination of the volume of water which must be removed from the well prior to sample collection. A copy of this work sheet appears as Figure E-3.

In addition to the field work sheet, a detailed account of all groundwater sampling procedures will be kept in a field log book. The primary purpose for utilizing such a book is to record enough information about the sampling procedures, so the entire event can be reconstructed without the need to rely on the sample collector's memory. The log book should consist of bound pages which are consecutively numbered. At a minimum, the following information will be included in the field log book for work done at each well:

FIGURE E-3

PROTECO
GROUNDWATER MONITORING WELL SAMPLING
FIELD WORK SHEET

1. Date: ________/ ______/ ______.

2. Personnel Present: ________, ________, ________, ________

3. Well ID: # ____________

4. Does the well show any sign of tampering? Yes ____ No ____

   If yes, describe:

5. Depth of well (L_{wc}): ________________ feet.

6. Depth to water (L_{dtw}): ________________ feet.

7. Height of water column in well: __________ feet (Item 5 less Item 6).

8. Diameter of well: _______ inches or __________ feet.

9. Volume of standing water in well: ________ gallons

10. Amount of water removed from well prior to sampling.

    Date: Time Start: Time Stop: # of Gallons Removed:

* Total Gallons Removed: ________

* (This value must at least be equal to the volume noted in Table E-5.)

(0597B-11)

- Sampling location (well number)
- Date and personnel present
- Purpose for sampling (i.e., quarterly sampling for detection monitoring background determination)
- Depth-to-water measurement
- Well evacuation method and volumes removed prior to sample collection
- Name of sample collector
- Time of sampling
- Sampling method
- Sample I.D. number (from lab analyses request sheets)
- Type of preservation used
- Appearance of each sample including the results of any analyses done in the field
- Sample shipment details (i.e., when shipped, by whom, to where)
- Analyses to be performed

The log book will be kept in a safe location at the PROTECO office when not being used in the field, and will always be available for inspection. All records pertaining to the groundwater monitoring program will be retained at the PROTECO office for the life of the facility and during the post-closure care period.

ANALYTICAL PROCEDURES - PROTECO is presently using Environmental Quality Laboratories, Inc. (EQLab) in Santurce, Puerto Rico to analyze groundwater samples taken in conjunction with the groundwater monitoring program. Other laboratories that could be used for these analyses include Caribtec in San Juan, Envirolab in Ponce, and Omni Research in San German. EQlab maintains a log book of records documenting the chain of custody of each sample, and the status of each samples analysis.

For metals, except where the analytical techniques requires otherwise, each sample will be split into two aliquots. One aliquot will be filtered and analyzed for dissolved metals. The other aliquot will not be filtered and will be analyzed for "total recoverable" metals. These procedures, outlined in Methods for Chemical Analysis of Water and Wastes, are designed to yield "total" concentrations of "dissolved recoverable" metals before acidification. Sample preparation for other inorganic parameters should also be based on measuring the total effect of each parameter on the sample.

Specific conductance, pH and temperature will be analyzed in the field by PROTECO using portable test meters after January 1, 1986. Exposure to the atmosphere, temperature change, and the addition of preservatives can initiate changes in these parameters.

Table E-2 describes the test methods that are used by the laboratory (i.e., (EQLab) to measure each of the analytical parameters used in the groundwater detection monitoring program at PROTECO. The table also lists a reference source for each method. Under normal circumstances, the time elapsed between receipt of a sample and analysis is dependent on the holding time for the various tests, between 24 hours and 20 days. Holding times for several parameters such as Phenols, Total Organic Carbon and specific conductance, and pH are as short is 6 to 24 hours. These holding times are based on Table 1 of Manual of Groundwater Sampling Procedures by Marion R. Scalf, James F. McNabb et al, NWWA/EPA Series, 1981. Table E-3 indicates holding times for individual constituents to be analyzed. Complete analyses including quality assurance/quality control results will be available to PROTECO within two months of sampling date.

STATISTICAL PROCEDURES - The use of statistical procedures in groundwater monitoring programs is to compare groundwater quality data from downgradient wells that have been potentially or actually affected by a subject facility with groundwater quality data from background wells. These comparisons are based on statistical tests which determine if significant differences exist between the two sets of water quality data for individual parameters.

For detection monitoring, the USEPA has recommended that a specific statistical test be used for comparison of data between background and downgradient wells. This statistical test, Cochran's Approximation to the

PARAMETERS AND TEST METHODS

Parameter	Test Method	Reference
Arsenic	Atomic Absorption	Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020, March 1983.
Barium	Atomic Absorption	Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020, March 1983.
Cadmium	Atomic Absorption	Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020, March 1983.
Fluoride	Colorimetric or Potentiometric	Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020, March 1983.
Lead	Atomic Absorption	Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020, March 1983.
Mercury	Atomic Absorption	Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020, March 1983.
Selenium	Atomic Absorption	Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020, March 1983.
Silver	Atomic Absorption	Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020, March 1983.
Lindane	Gas Chromatograph	Methods for Benzidine, Chlorinated Organic Compounds, Pentachlorophenol and Pesticides in Water and Wastes

FARAMETERS AND TEST METHODS

Parameter	Test Method	Reference
Phenols	Chloroform Extraction Method 510B	Standard Methods For the Examination of Water & Wastewater 16th edition, 1985.
pH	Electrometric	Test Methods for Evaluating Solid Waste. Physical/Chemical Methods, USEPA SW-846.
Specific Conductivity	Method 120.1	Methods for Chemical Analysis of Water and Wastes, EPA-600/4-790020, March 1983.
Total Organic Carbon	Combustion, Methods 415.1	Methods for Chemical Analysis of Water and Wastes, EPA-600/4-790020, March 1983.
Volatile Organics	Gas Chromatograph/ Mass Spectrometer	Federal Register, Volume 49, 209 October 26, 1984. USEPA Method 624.

HOLDING TIMES FOR LABORATORY ANALYSIS

Parameter	Holding Time
Arsenic	6 Mos.
Barium	6 Mos.
Cadmium	6 Mos.
Chromium	6 Mos.
Fluoride	7 Days
Lead	6 Mos.
Mercury	28 Days
Selenium	6 Mos.
Silver	6 Mos.
Lindane	7 Days
Phenols	24 Hrs.
pH	6 Hrs.
Specific Conductivity	24 Hrs.
Total Organic Carbon	24 Hrs.
Volatile Organics	14 Days

Behrens-Fisher (CABF) Students' t-test, specified in Part 264 Appendix IV, is applicable to those parameters that display approximately normal distributions. Normal distributions are those where the sample data have estimated coefficients of variations less than 1.0. This criteria is intended to eliminate grossly non-normal data from being used in the test.

If the background data show an estimated coefficient of variation less than 1.0 for all monitoring parameters, then the statistical test specified by EPA may be applied. In accordance with Section 264.98(c)(2), PROTECO will present the background data in a form necessary for determination of statistically significant increases. The following is required for each parameter:

n_b - the number of measurements
x_b - the mean of the measurements calculated by

$$\overline{X}_b = \quad \underset{i\,=\,1}{Xi/n}$$

in which X_i is the measurement i of parameter X

S_b - the standard deviation of the measurements calculated by

$$Sb = i = 1 \; \frac{(X_i - X)^2}{n_b - 1}$$

CV_b - coefficient of variation of the measurement calculated by

$$CV_b = s_b \quad X_b$$

Once the background values have been established, the statistical test is performed on each parameter with data obtained from each downgradient monitoring well for samples collected at least semi-annually according to Section 264.97(1)(i). This is done to determine whether the difference between the mean of the constituent at each well and the mean background value is significant at the 0.05 level.

CABF statistical test procedure is outlined in Appendix IV of 40 CFR Part 264. The procedure is as follows:

Using all the available background data (n_b readings), calculate the background mean (X_b) and background variance (s_b2). For the single monitoring well under investigation (n_m reading), calculate the monitoring mean (X_m) and monitoring variance ($s_m{}^2$).

For any set of data (X_1, X_2 ... X_n) the mean is calculated by:

$$X = \frac{X_1 + X_2 \ldots + X_n}{n}$$

and the variance is calculated by:

$$S^2 = \frac{(X_1 - X)^2 \ldots + (X_n - X)^2}{n}$$

Where "n" denotes the number of observations in the set of data.

The test uses these data summary measures to calculate a t-statistic (t*) and a comparison t-statistic (T_c). The T* value is compared to the t_c value and a conclusion reached as to whether there has been a statistically significant change in any indicator parameter.

The t-statistic for all parameters except pH and similar monitoring parameters is:

$$t^* = \frac{\bar{X}_m \quad \bar{X}_b}{\frac{s_m2}{n_m} + \frac{s_b2}{n_b}}$$

If the value of this t-statistic is negative, then there is no significant difference between the monitoring data and background data. it should be noted that significantly small negative values may be indicative of a failure of the assumption made for test validity or errors have been made in collecting the background data.

T-statistic (t_c), which t* will be compared, necessitates finding t_b and t_m from standard (one-tailed) tables where,

t_b = t-tables with (n_b-1) degrees of freedom, at the 0.05 level of significance.

t_m = t-tables with (n_m-1) degrees of freedom, at the 0.05 level of significance.

Finally, the special weightings W_b and W_m are defined as:

$$W_b = \frac{s_b^2}{n_b} \text{ and } W_m = \frac{s_m^2}{n_m}$$

and so the comparison t-statistic is:

$$t_c = \frac{W_b t_b + W_m tm}{W_b + W_m}$$

The t-statistic (t*) is now compared with the comparison t-statistic (t_c) using the following decision-rule:

If t* is equal to or larger than t_c, then conclude that there most likely has been a significant increase in this specific parameters.

If f* is less than t_c, then conclude that most likely there has not been a change in this specific parameter.

The t-statistic for testing pH and similar monitoring parameters is constructed in the same manner as previously described except the negative sign (if any) is discarded and the caveat concerning the negative value is ignored. The standard (two-tailed) tables are used in the construction t_c for pH and similar monitoring parameters.

If t* is equal to or larger than t_c, then conclude that there most likely has been a significant increase (if the initial t* had been negative, this would imply a significant decrease). If t* is less than t_c, then conclude that there most likely has been no change.

A standard table for t-values in one and two-tailed tests is provided in Table E-4.

BACKGROUND VALUE ESTABLISHMENT - Background values for each regulated unit list of parameters will be established through a quarterly sampling

Values of t-Statistic for One- and Two-Tailed Tests at a Level of Significance of 0.05 (from Fisher and Yates).

DEGREES OF FREEDOM	t-values (one - tail)	t-values (one - tail)
1	6.314	12.706
2	2.920	4.303
3	2.353	3.182
4	2.132	2.776
5	2.015	2.571
6	1.943	2.447
7	1.895	2.365
8	1.860	2.306
9	1.833	2.262
10	1.812	2.228
11	1.796	2.201
12	1.782	2.179
13	1.771	2.160
14	1.761	2.145
15	1.753	2.131
16	1.746	2.120
17	1.740	2.110
18	1.734	2.101
19	1.729	2.093
20	1.725	2.086
21	1.721	2.080
22	1.717	2.074
23	1.714	2.069
24	1.711	2.064
25	1.708	2.060
30	1.697	2.042
40	1.684	2.021

program conducted at the background monitoring location. At each quarterly sampling, four replicate samples will be collected from the background location and analyzed for each listed parameter to account for any variations as a result of analytical procedures. The four values obtained for each parameter will then be averaged to arrive at one average value for each parameter for that sampling campaign. A similar procedure will be followed for each quarterly sampling, resulting in the generation of four (4) average quarterly values for each parameter. These four values will then be averaged to produce one average annual value for each parameter. This procedure is designed to take into account any seasonal variations which may occur in the vicinity of the PROTECO Facility.

Once these values have been established, they will be used in the specified statistical procedure to determine if statistically significant increases in background are occurring in the downgradient wells. This procedure will be repeated each year in order to update background values on an annual basis. In establishing background levels for a detection monitoring program, certain procedures have been followed that are described in the previous section under Statistical Procedures.

APPENDIX E.1

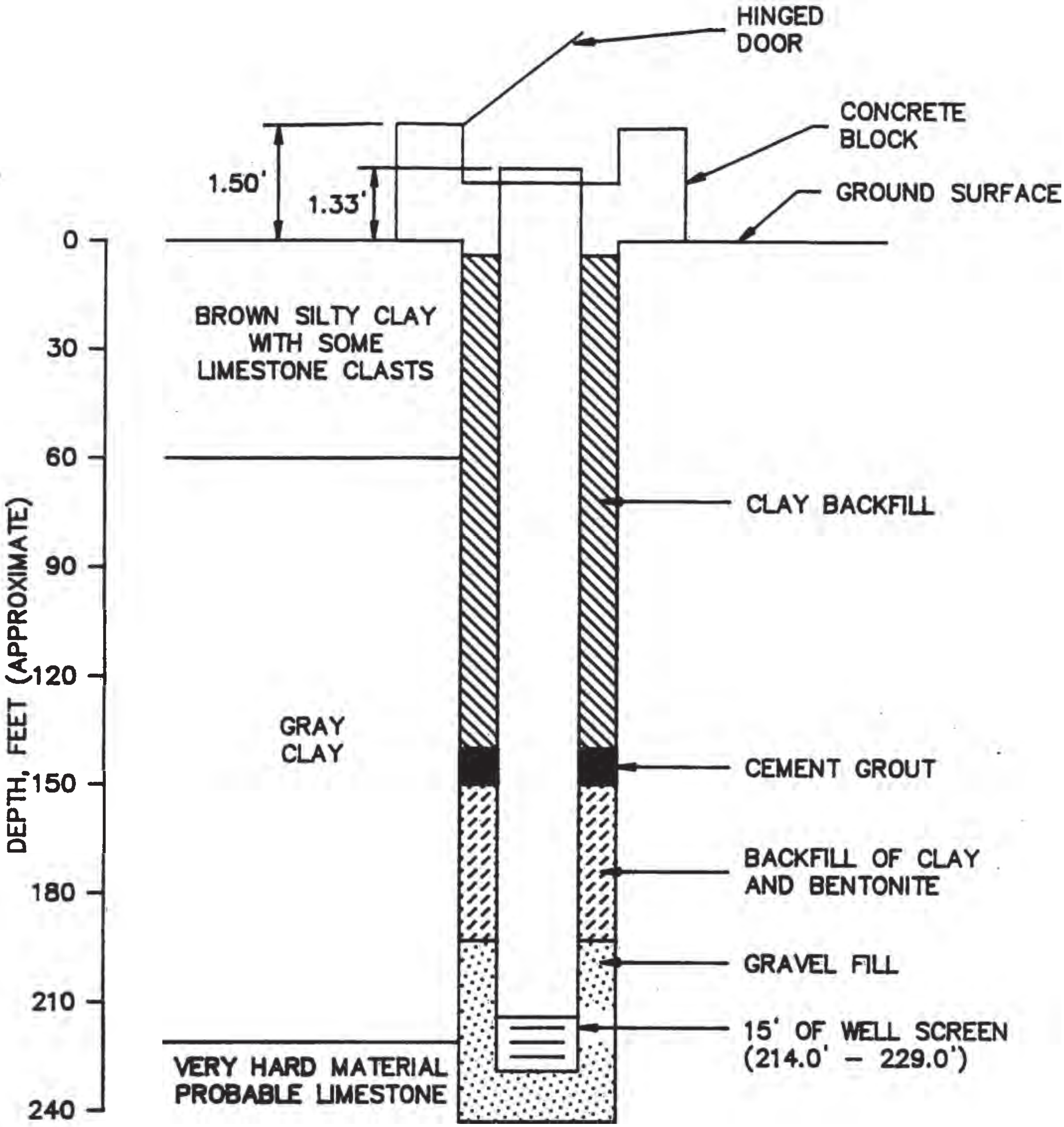


FIGURE 1

MONITORING WELL 1W81
CONSTRUCTION SPECIFICATIONS

PROTECO SITE
PEÑUELAS, PUERTO RICO

FRED C. HART ASSOCIATES, INC.

NOT TO SCALE

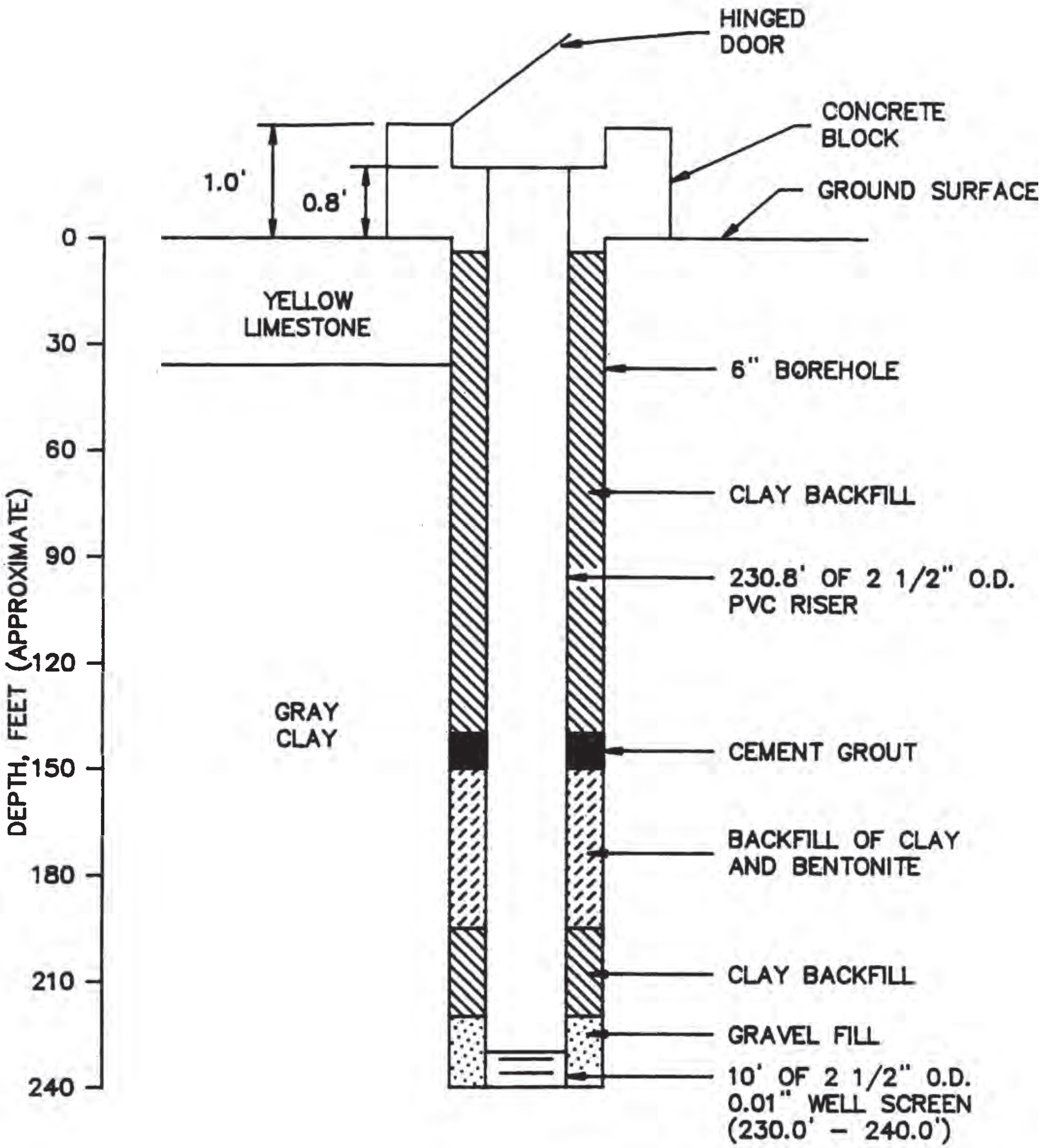


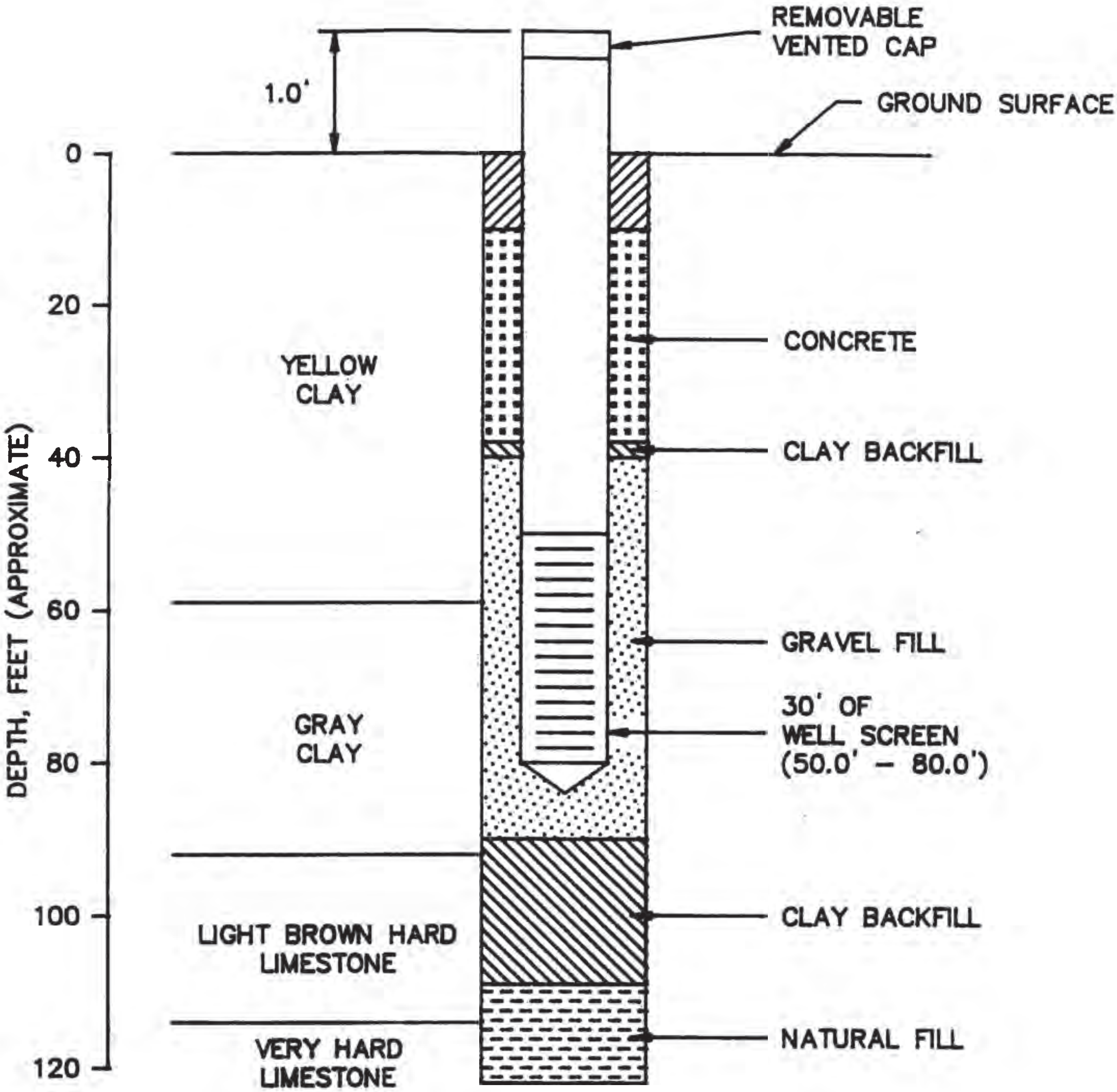
FIGURE 2

MONITORING WELL 2W81
CONSTRUCTION SPECIFICATIONS

PROTECO SITE
PEÑUELAS, PUERTO RICO

FRED C. HART ASSOCIATES, INC.

NOT TO SCALE



NOTE:

a—ALL PVC CONNECTIONS MADE WITH 3 STAINLESS STEEL SELF TAPPING SCREWS.

b—HOLE COLLAPSED BELOW 107' AFTER ATTEMPED PUMP IN TEST.

NOT TO SCALE

FIGURE 3

MONITORING WELL 3W81 CONSTRUCTION SPECIFICATIONS

PROTECO SITE
PEÑUELAS, PUERTO RICO

FRED C. HART ASSOCIATES, INC.

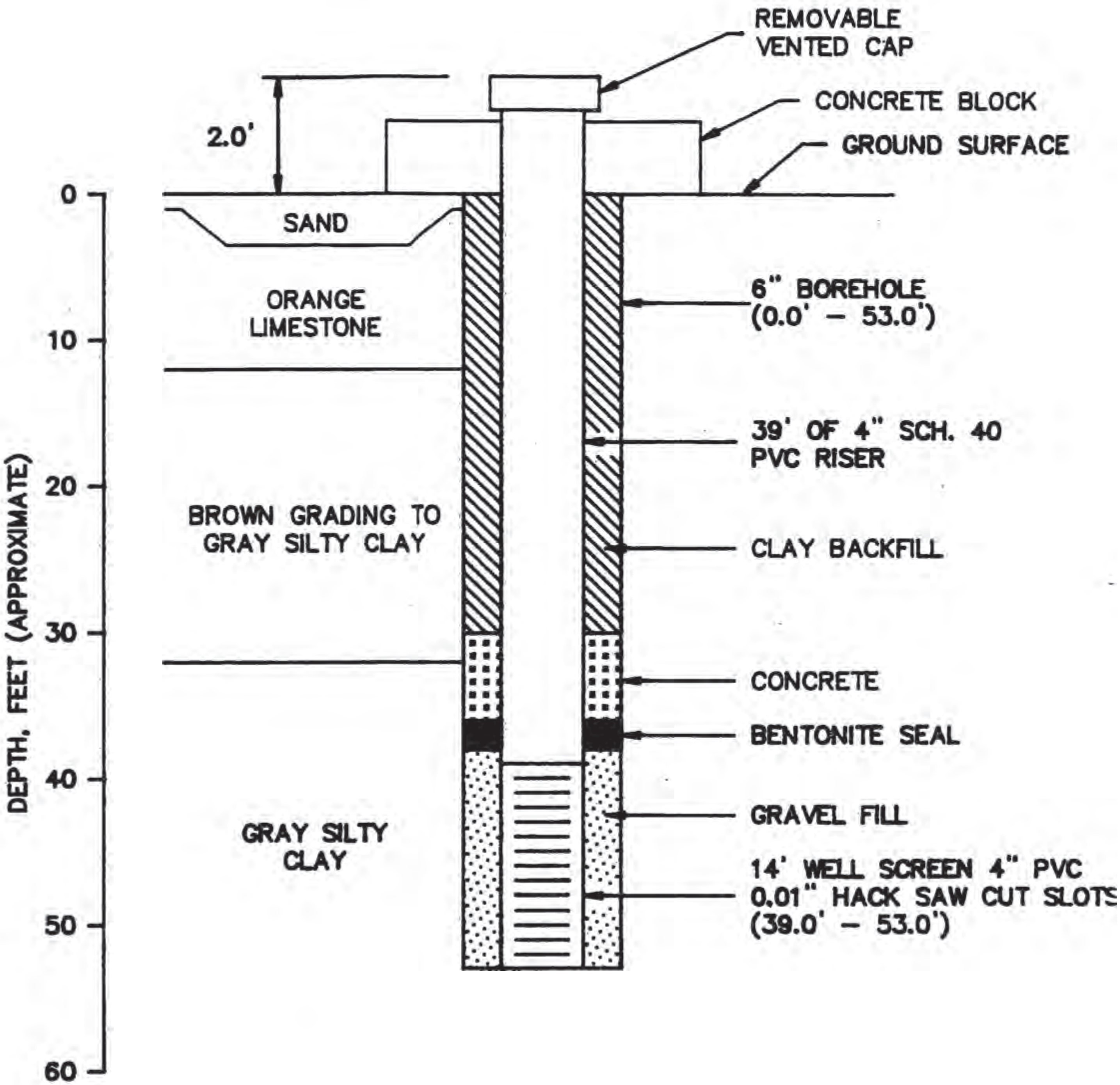


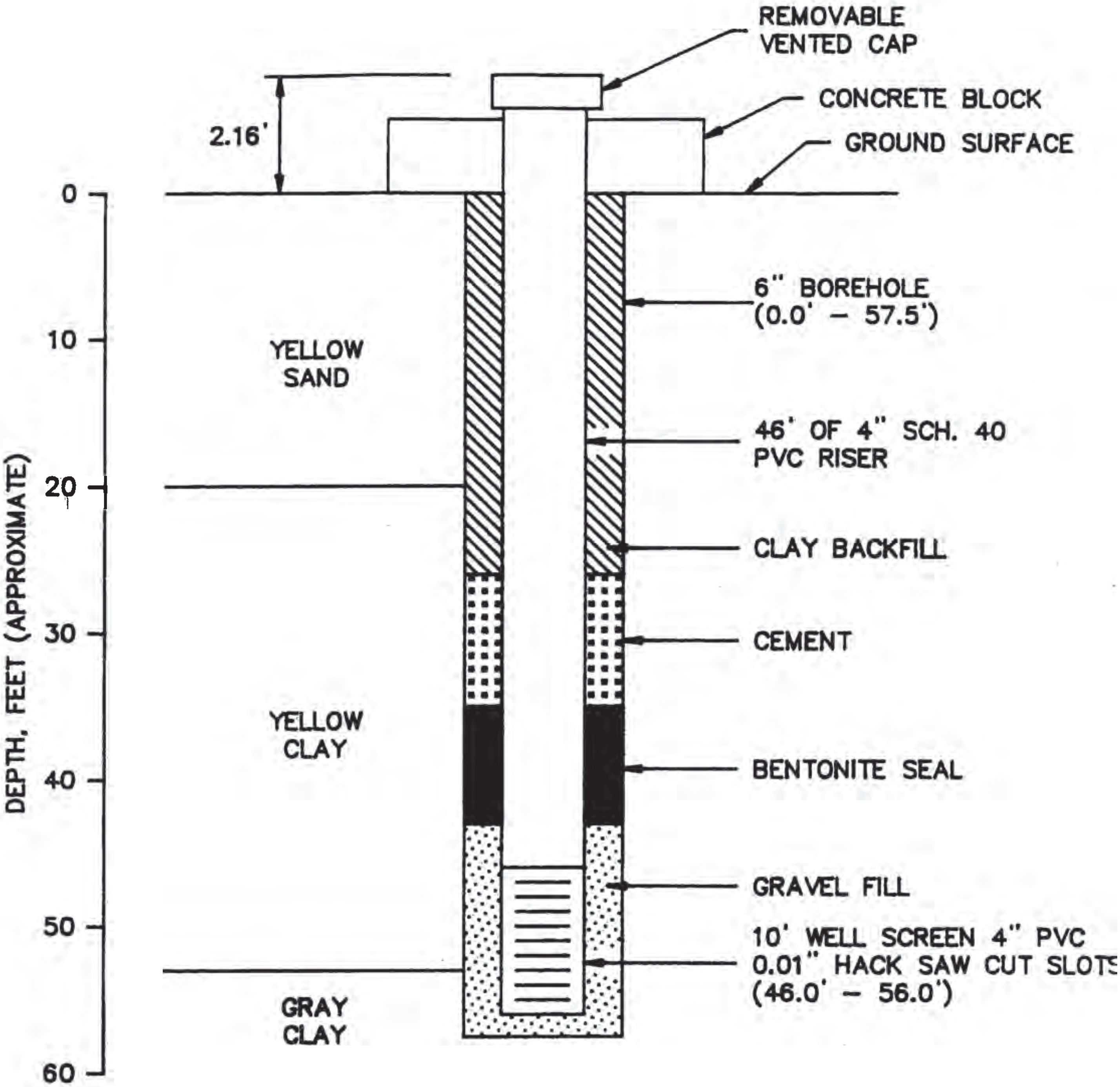
FIGURE 4

MONITORING WELL 4WB1
CONSTRUCTION SPECIFICATIONS

PROTECO SITE
PEÑUELAS, PUERTO RICO

FRED C. HART ASSOCIATES, INC.

NOT TO SCALE



NOTE:
SINCE THIS CONSTRUCTION DIAGRAM WAS DRAWN 7.76 ADDITIONAL FEET OF PVC WERE ADDED TO THE TOP OF THE CASING; NEW SURVEYED ELEVATION IS 335.86 FEET.

NOT TO SCALE

FIGURE 5

MONITORING WELL 9W81
CONSTRUCTION SPECIFICATIONS

PROTECO SITE
PEÑUELAS, PUERTO RICO

FRED C. HART ASSOCIATES, INC.

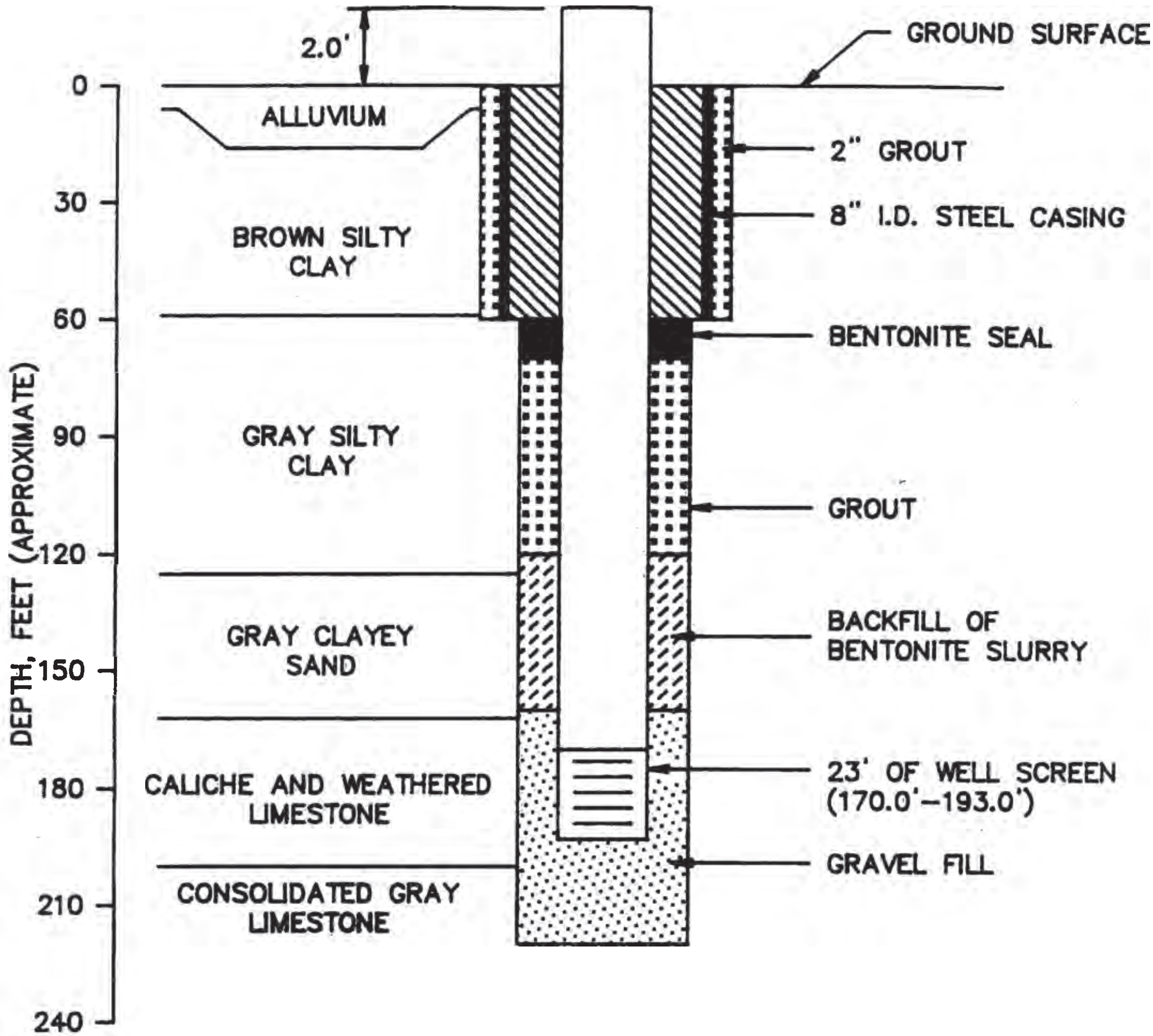


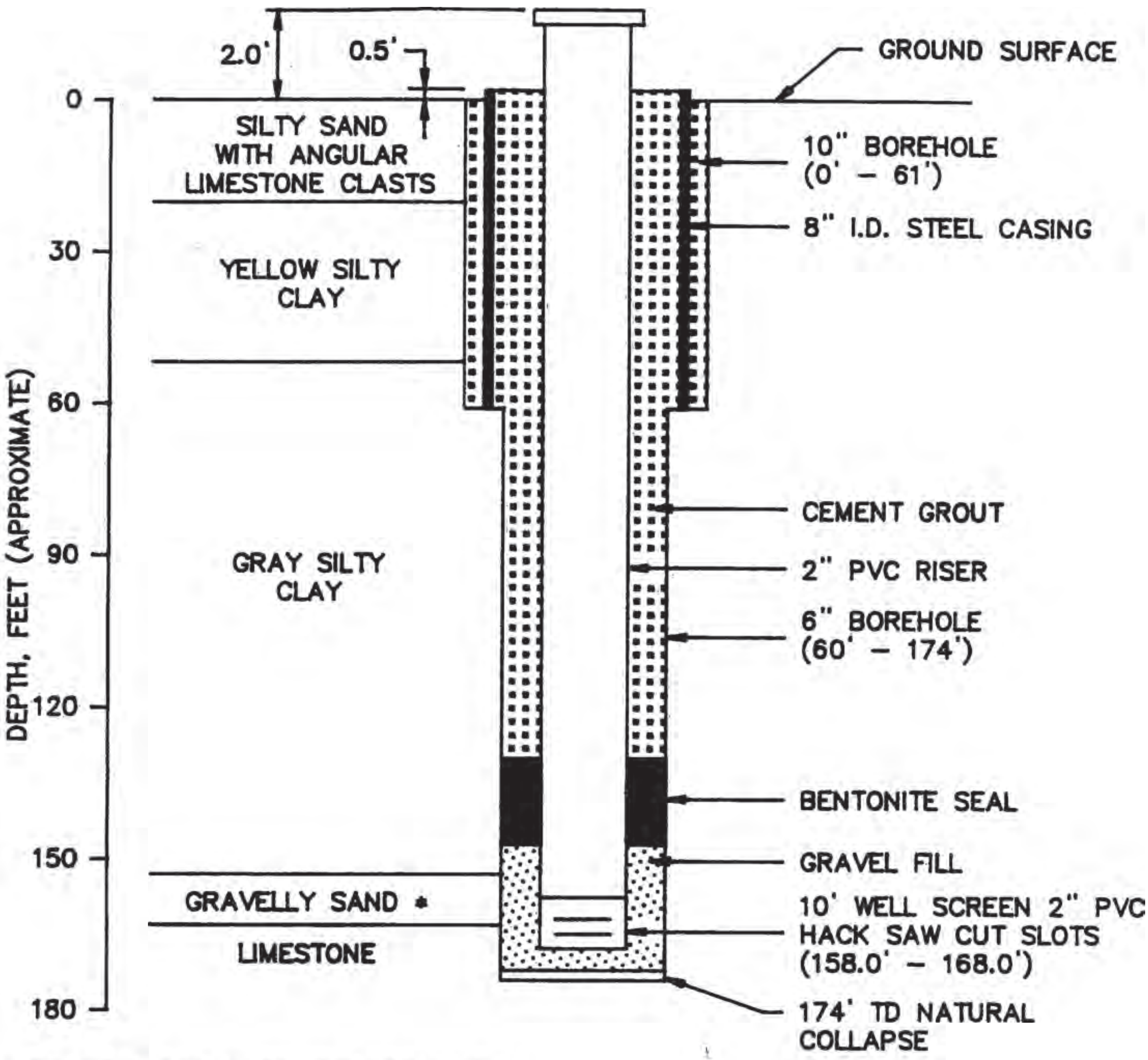
FIGURE 6

MONITORING WELL 11W83
CONSTRUCTION SPECIFICATIONS

PROTECO SITE
PEÑUELAS, PUERTO RICO

FRED C. HART ASSOCIATES, INC.

NOT TO SCALE



* PROBABLY GYPSUM AND LIMESTONE FRAGMENTS IN CLAY MATRIX.

FIGURE 7

MONITORING WELL 12W83
CONSTRUCTION SPECIFICATIONS

PROTECO SITE
PEÑUELAS, PUERTO RICO

FRED C. HART ASSOCIATES, INC.

NOT TO SCALE

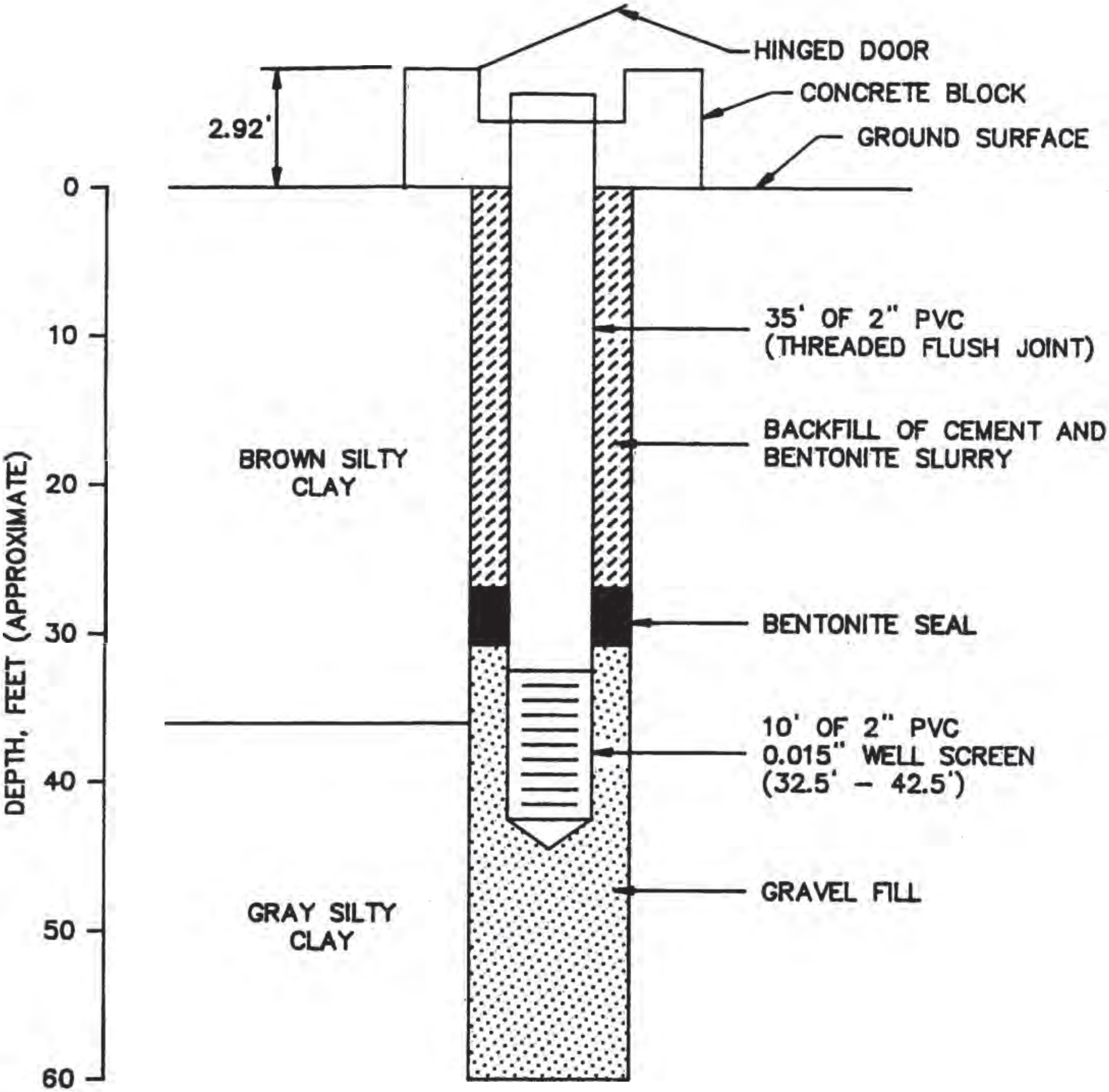


FIGURE 8

MONITORING WELL 14W85
CONSTRUCTION SPECIFICATIONS

PROTECO SITE
PEÑUELAS, PUERTO RICO

FRED C. HART ASSOCIATES, INC.

NOT TO SCALE

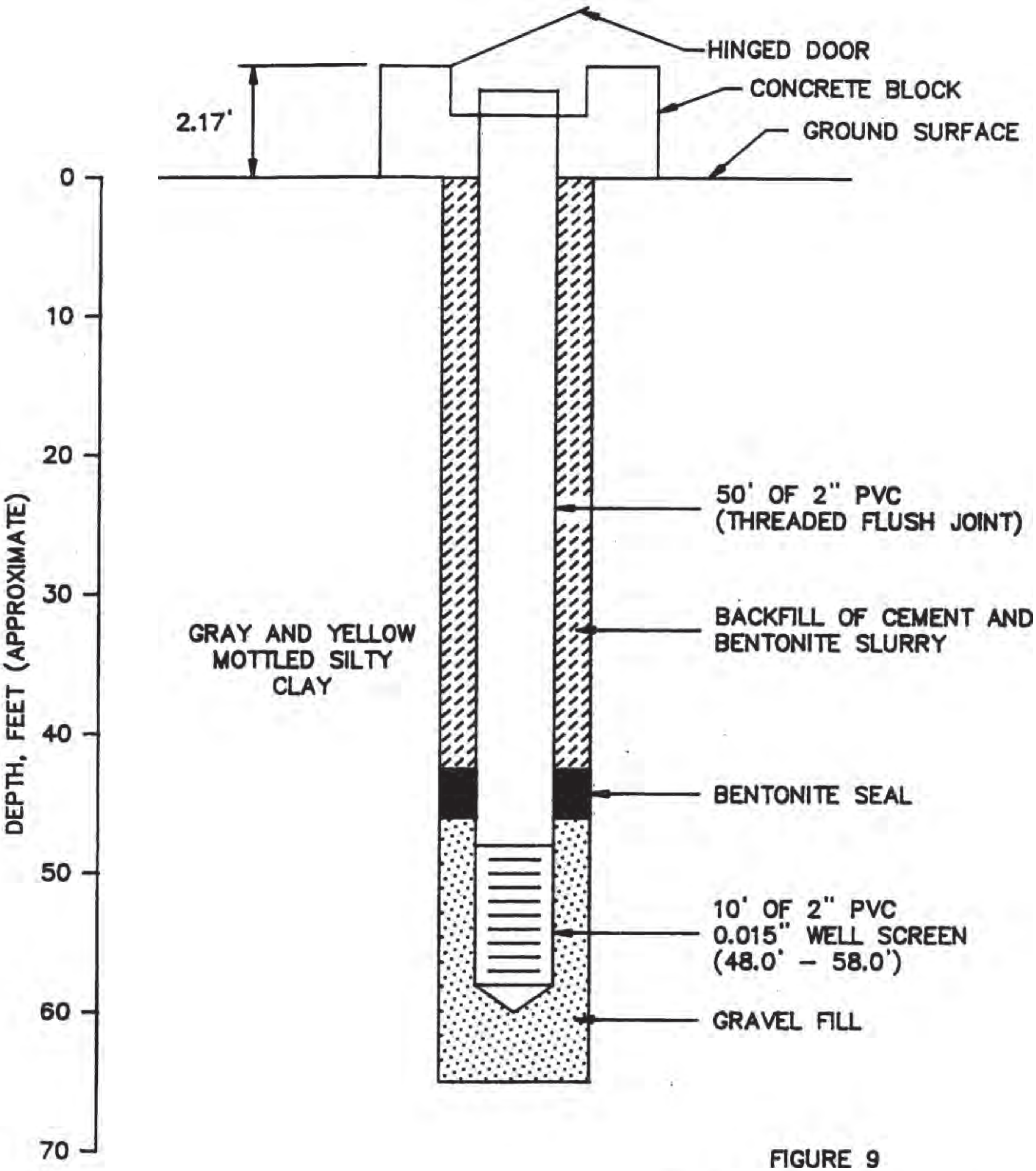


FIGURE 9

MONITORING WELL 15W85
CONSTRUCTION SPECIFICATIONS

PROTECO SITE
PEÑUELAS, PUERTO RICO

FRED C. HART ASSOCIATES, INC.

NOT TO SCALE

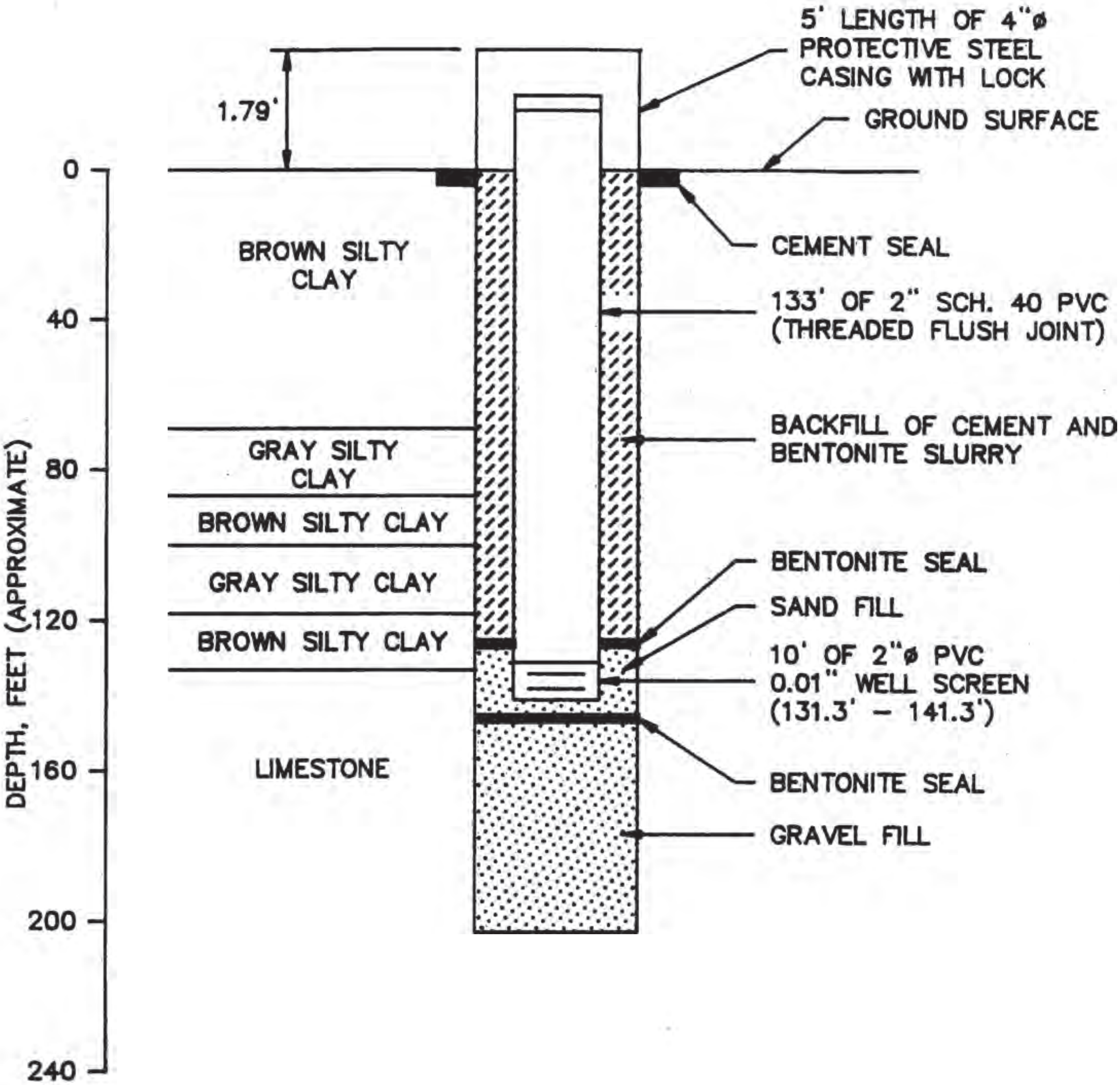


FIGURE 10

MONITORING WELL 16W85
CONSTRUCTION SPECIFICATIONS

PROTECO SITE
PEÑUELAS, PUERTO RICO

FRED C. HART ASSOCIATES, INC.

NOT TO SCALE

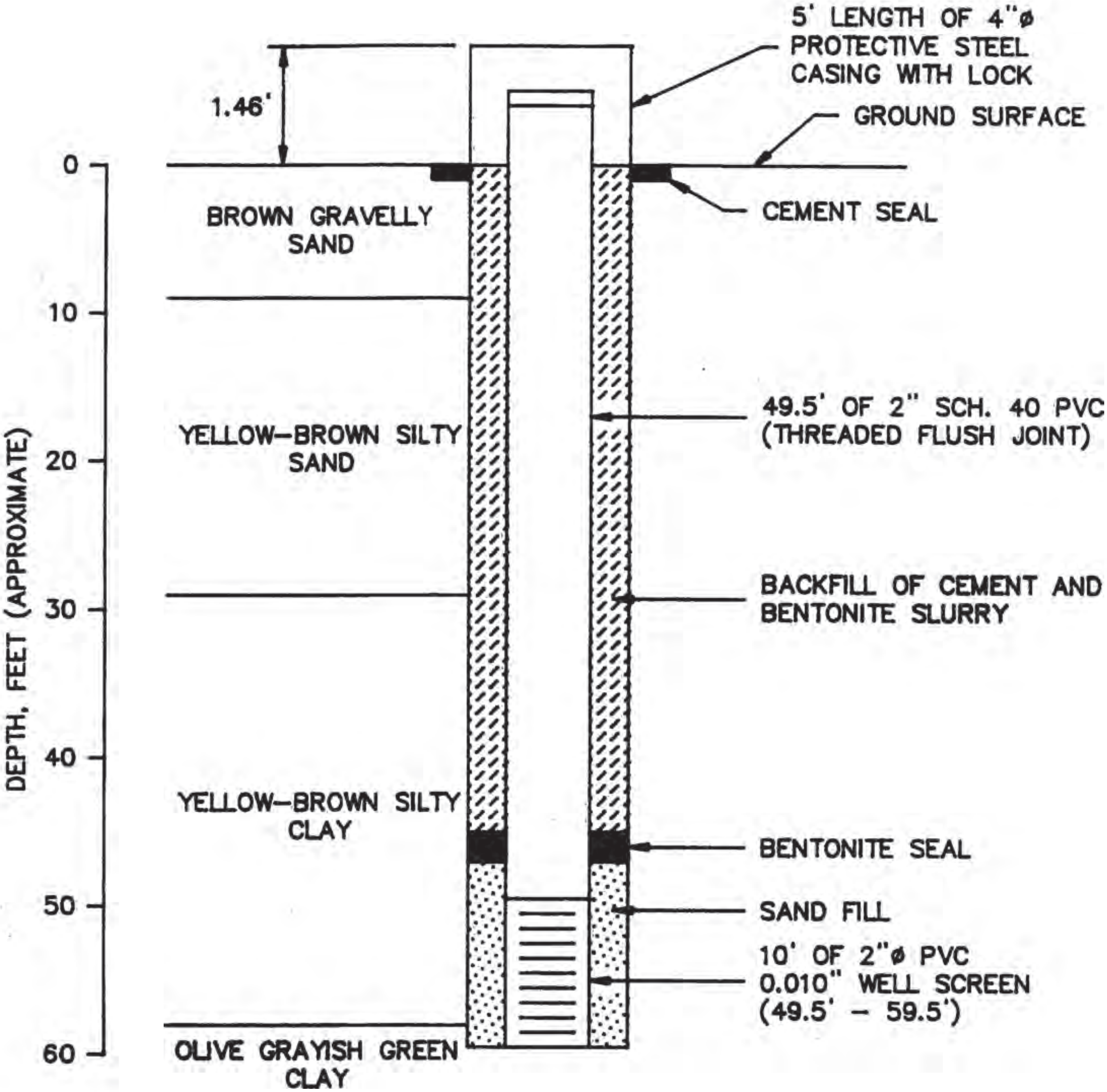


FIGURE 11

MONITORING WELL 18W85
CONSTRUCTION SPECIFICATIONS

PROTECO SITE
PEÑUELAS, PUERTO RICO

FRED C. HART ASSOCIATES, INC.

NOT TO SCALE

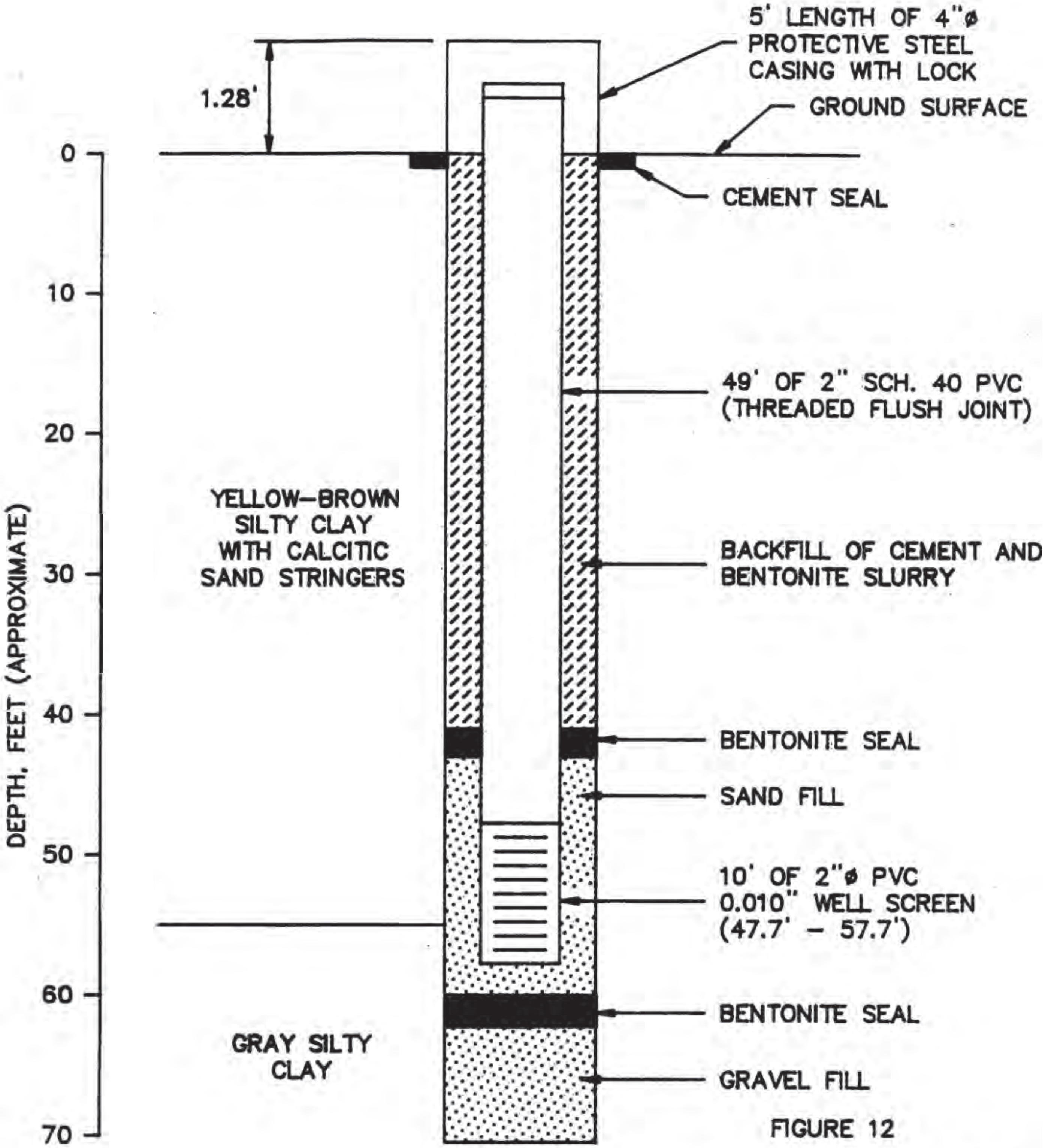


FIGURE 12

MONITORING WELL 21W85
CONSTRUCTION SPECIFICATIONS

PROTECO SITE
PEÑUELAS, PUERTO RICO

FRED C. HART ASSOCIATES, INC.

NOT TO SCALE

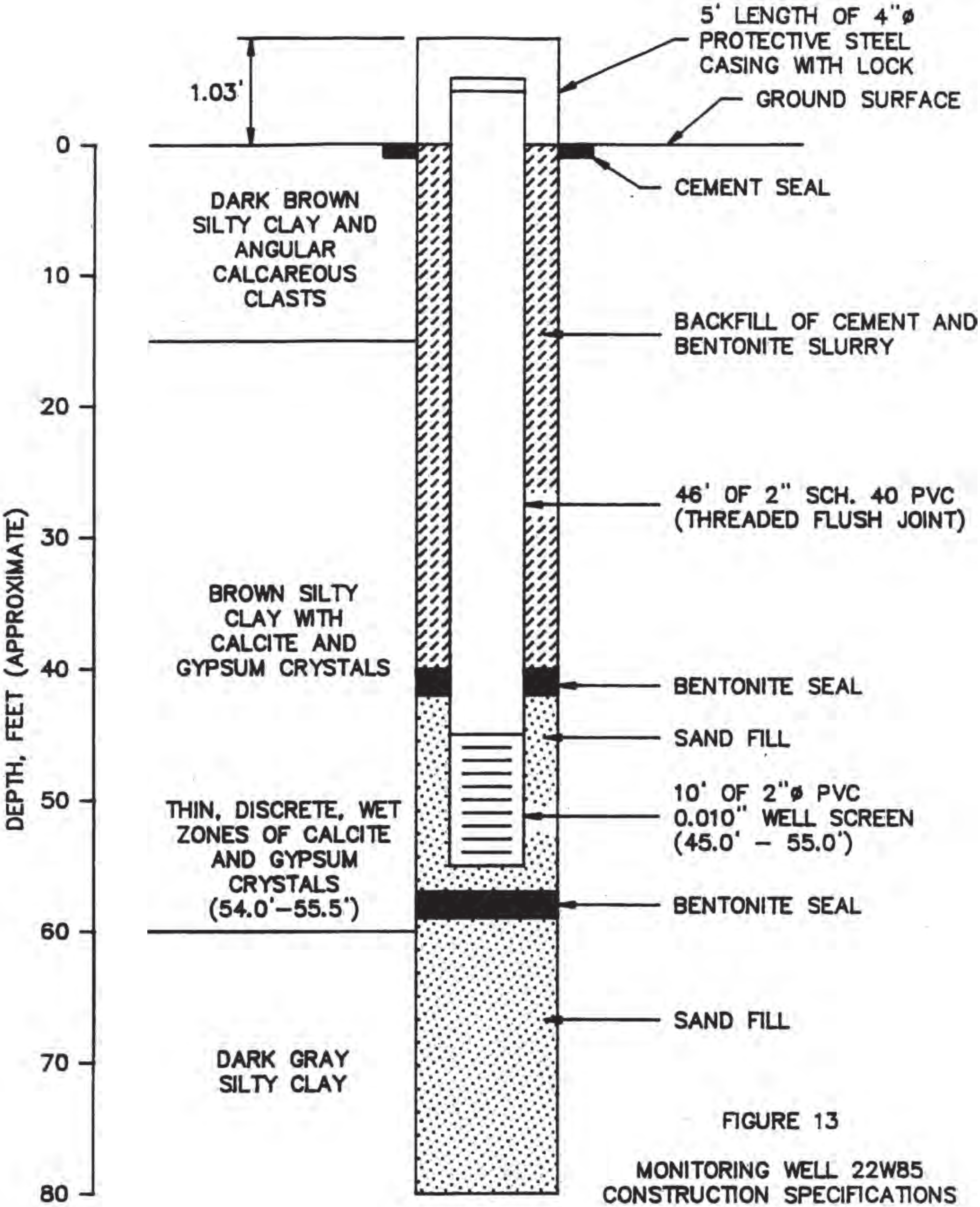


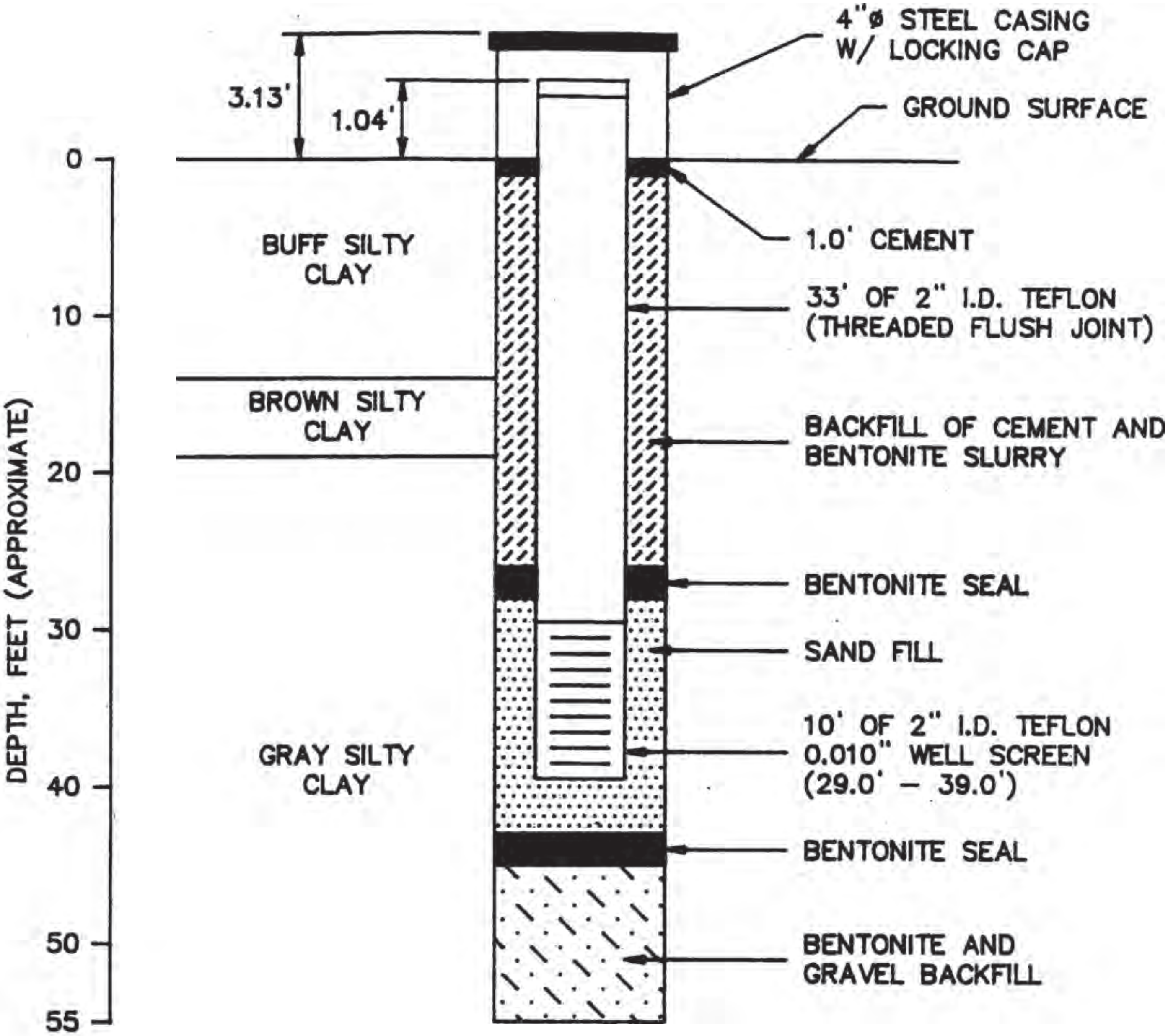
FIGURE 13

MONITORING WELL 22W85
CONSTRUCTION SPECIFICATIONS

PROTECO SITE
PEÑUELAS, PUERTO RICO

FRED C. HART ASSOCIATES, INC.

NOT TO SCALE



NOTES:

1. CONSTRUCTION COMPLETED ON 11–3–85.
2. DEVELOPED ON 11–3–85.

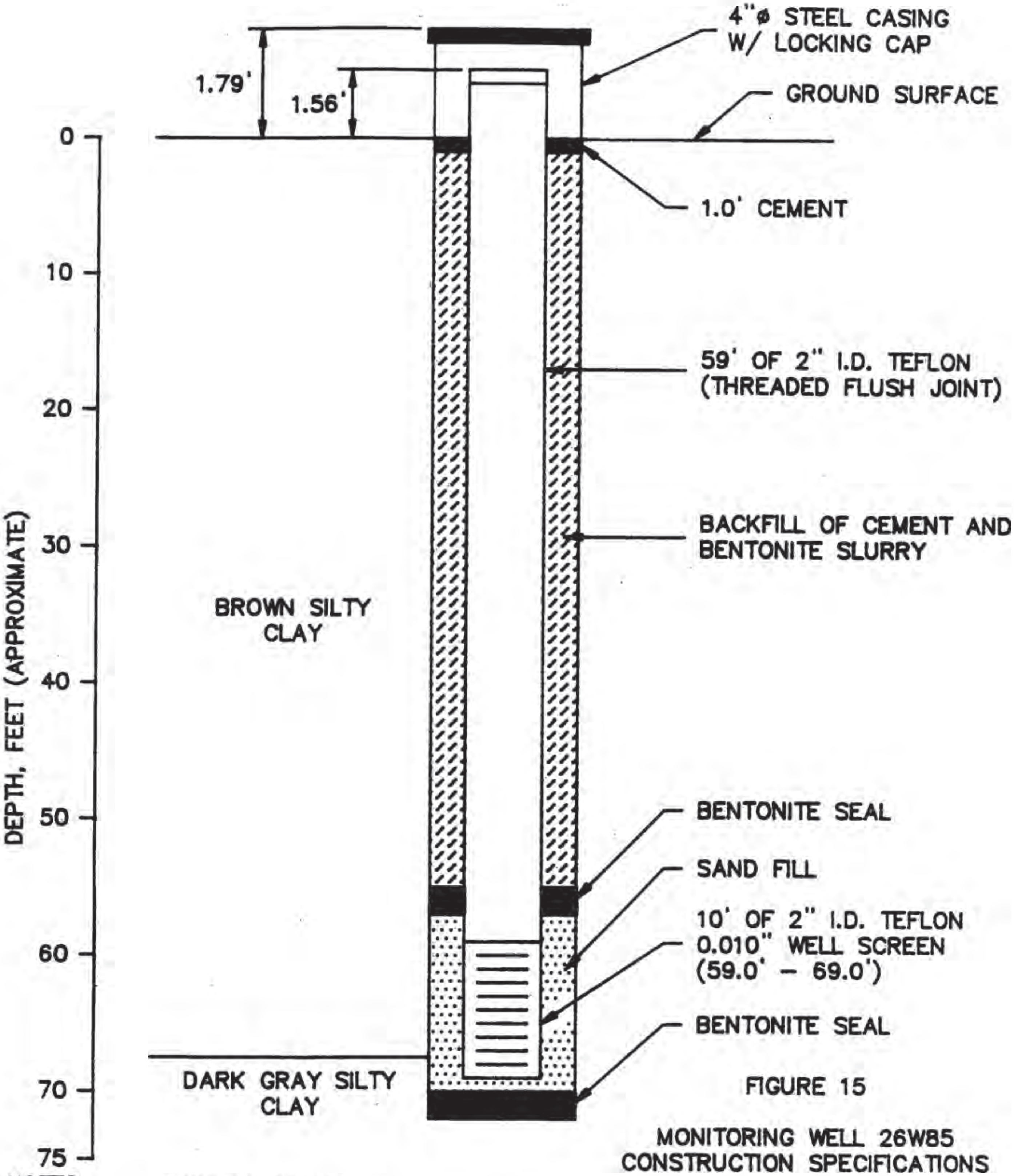
FIGURE 14

MONITORING WELL 23W85
CONSTRUCTION SPECIFICATIONS

PROTECO SITE
PEÑUELAS, PUERTO RICO

FRED C. HART ASSOCIATES, INC.

NOT TO SCALE



NOT TO SCALE

FIGURE 15

MONITORING WELL 26W85
CONSTRUCTION SPECIFICATIONS

PROTECO SITE
PEÑUELAS, PUERTO RICO

FRED C. HART ASSOCIATES, INC.

NOTES:

1. CONSTRUCTION COMPLETED ON 11-3-85.
2. DEVELOPED ON 11-3-85.

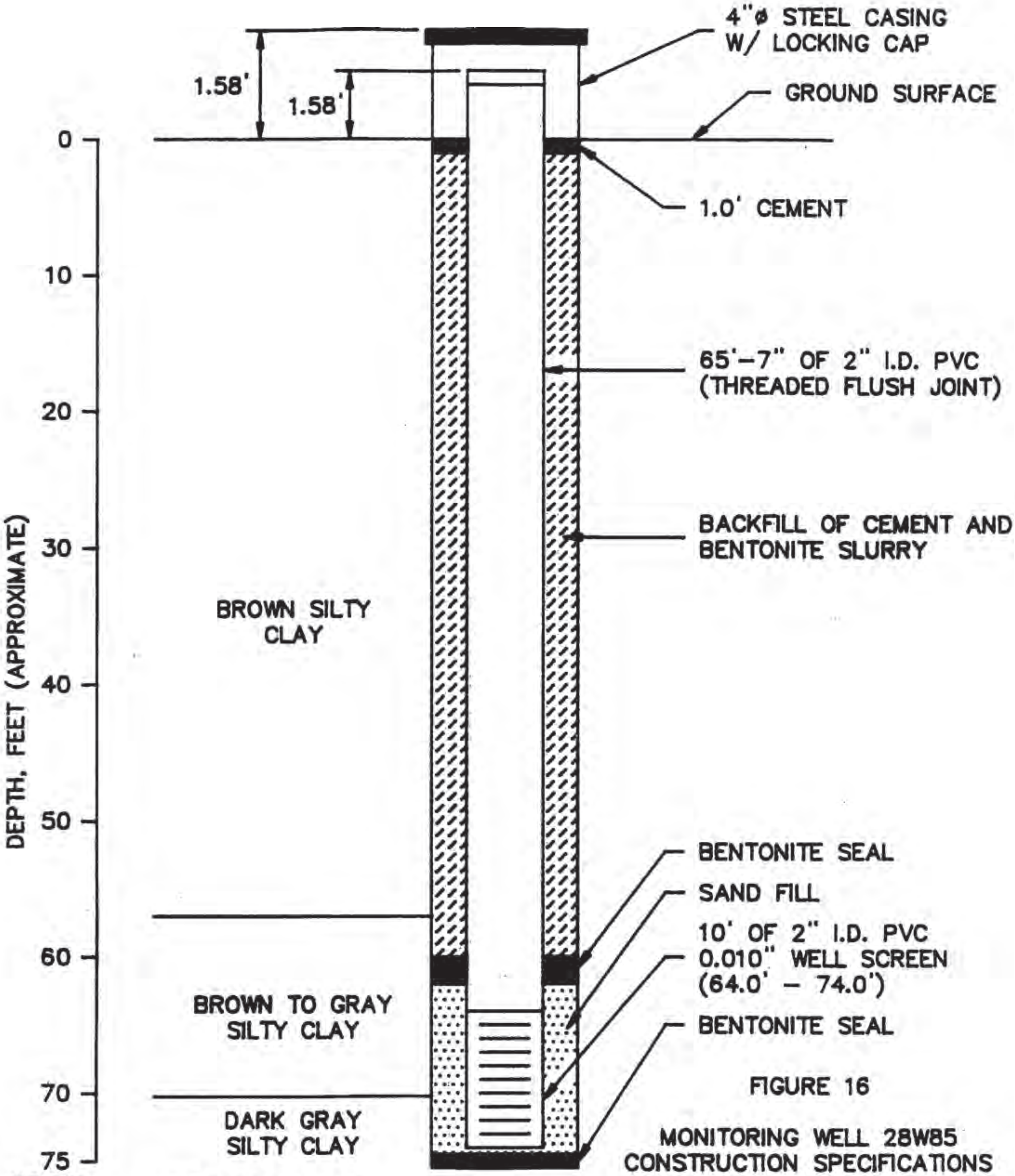


FIGURE 16

MONITORING WELL 28W85
CONSTRUCTION SPECIFICATIONS

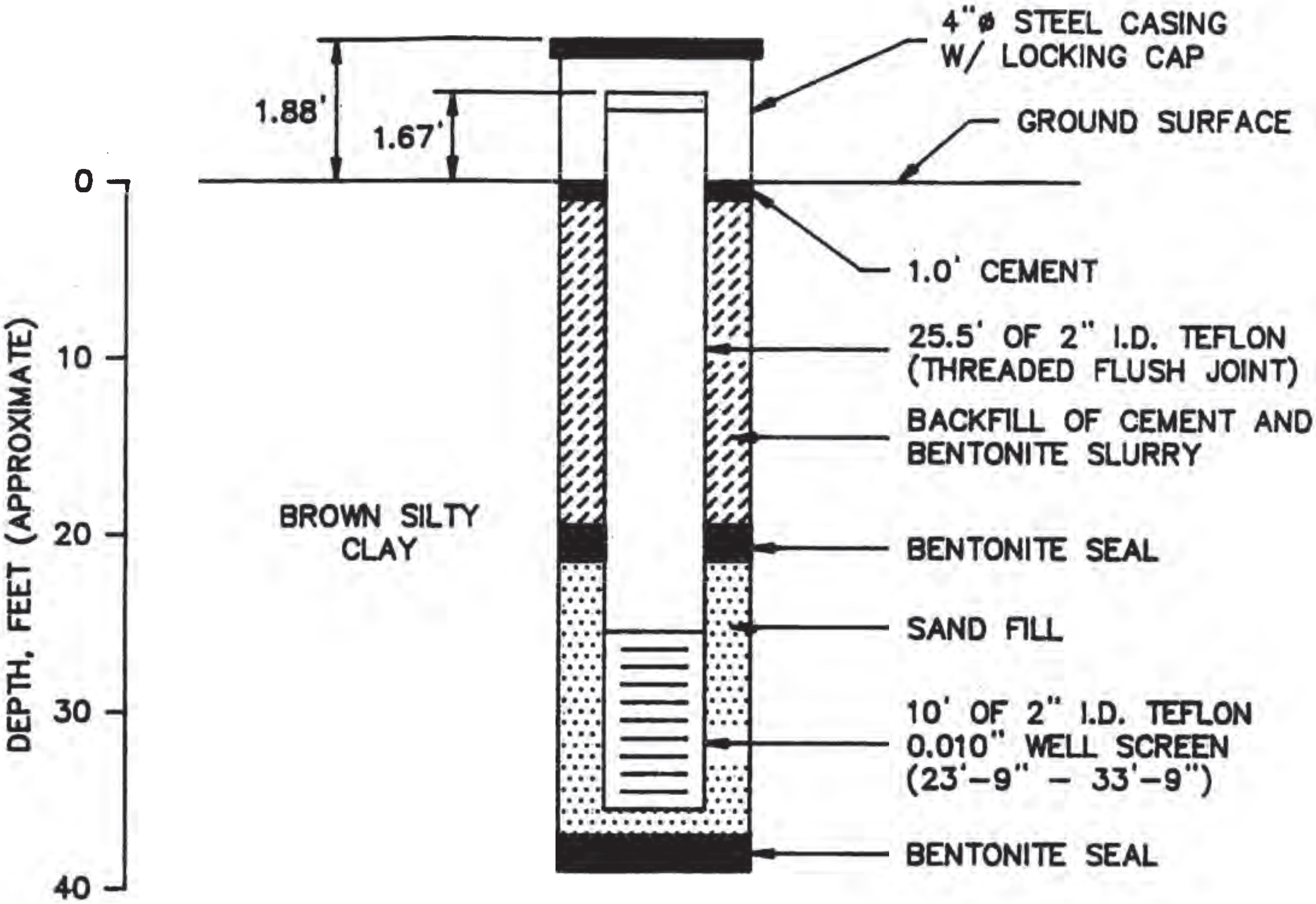
PROTECO SITE
PEÑUELAS, PUERTO RICO

NOTES: NOT TO SCALE

1. CONSTRUCTION COMPLETED ON 11-6-85.

2. DEVELOPED ON 11-7-85.

FRED C. HART ASSOCIATES, INC.



NOTES:

1. CONSTRUCTION COMPLETED 11-2-85.
2. DEVELOPED ON 11-3-85.

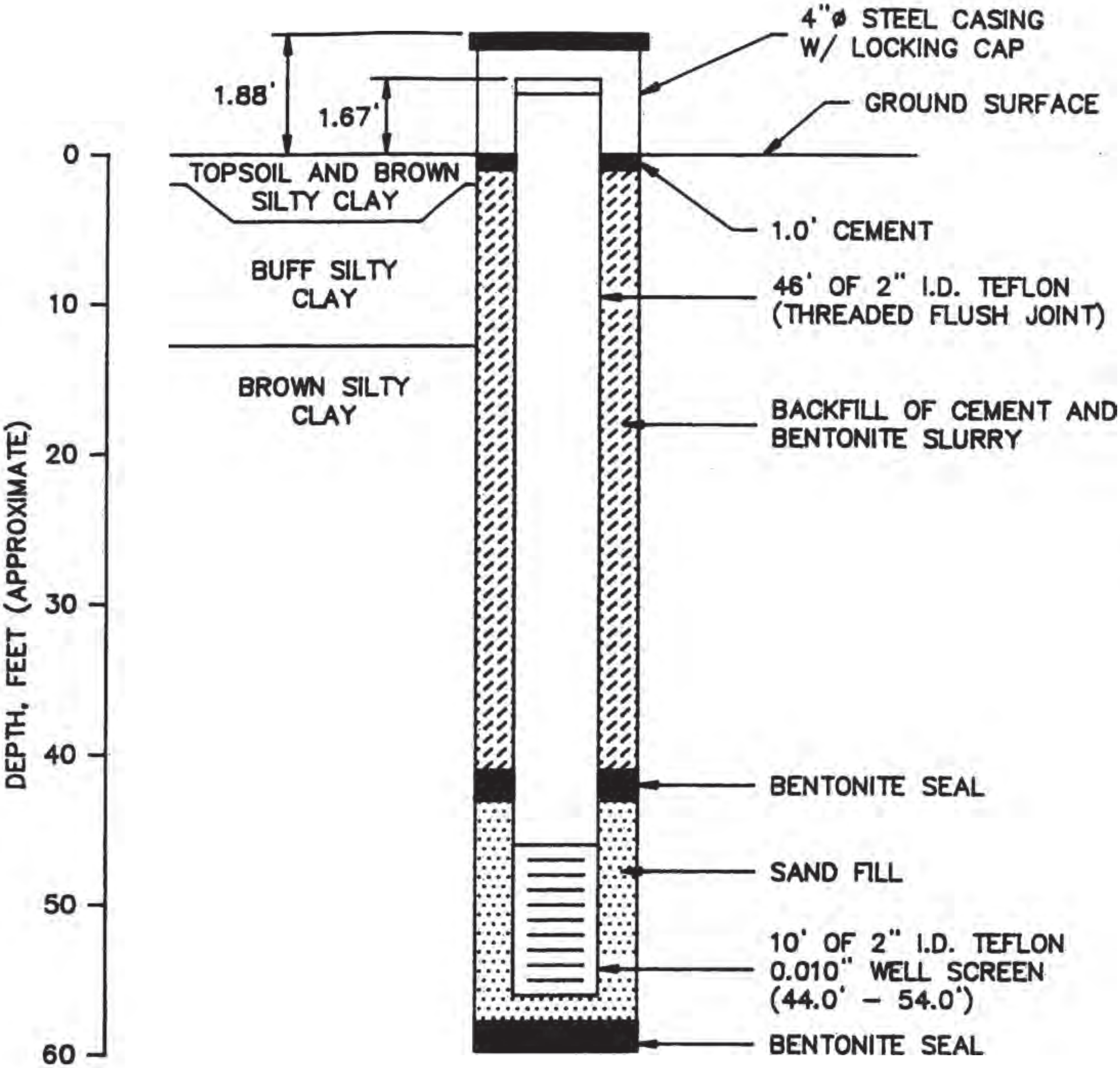
FIGURE 17

MONITORING WELL 29W85
CONSTRUCTION SPECIFICATIONS

PROTECO SITE
PEÑUELAS, PUERTO RICO

FRED C. HART ASSOCIATES, INC.

NOT TO SCALE



NOTES:

1. CONSTRUCTION COMPLETED ON 11-1-85.
2. DEVELOPED ON 11-3-85.

FIGURE 18

MONITORING WELL 30W85
CONSTRUCTION SPECIFICATIONS

PROTECO SITE
PEÑUELAS, PUERTO RICO

FRED C. HART ASSOCIATES, INC.

NOT TO SCALE

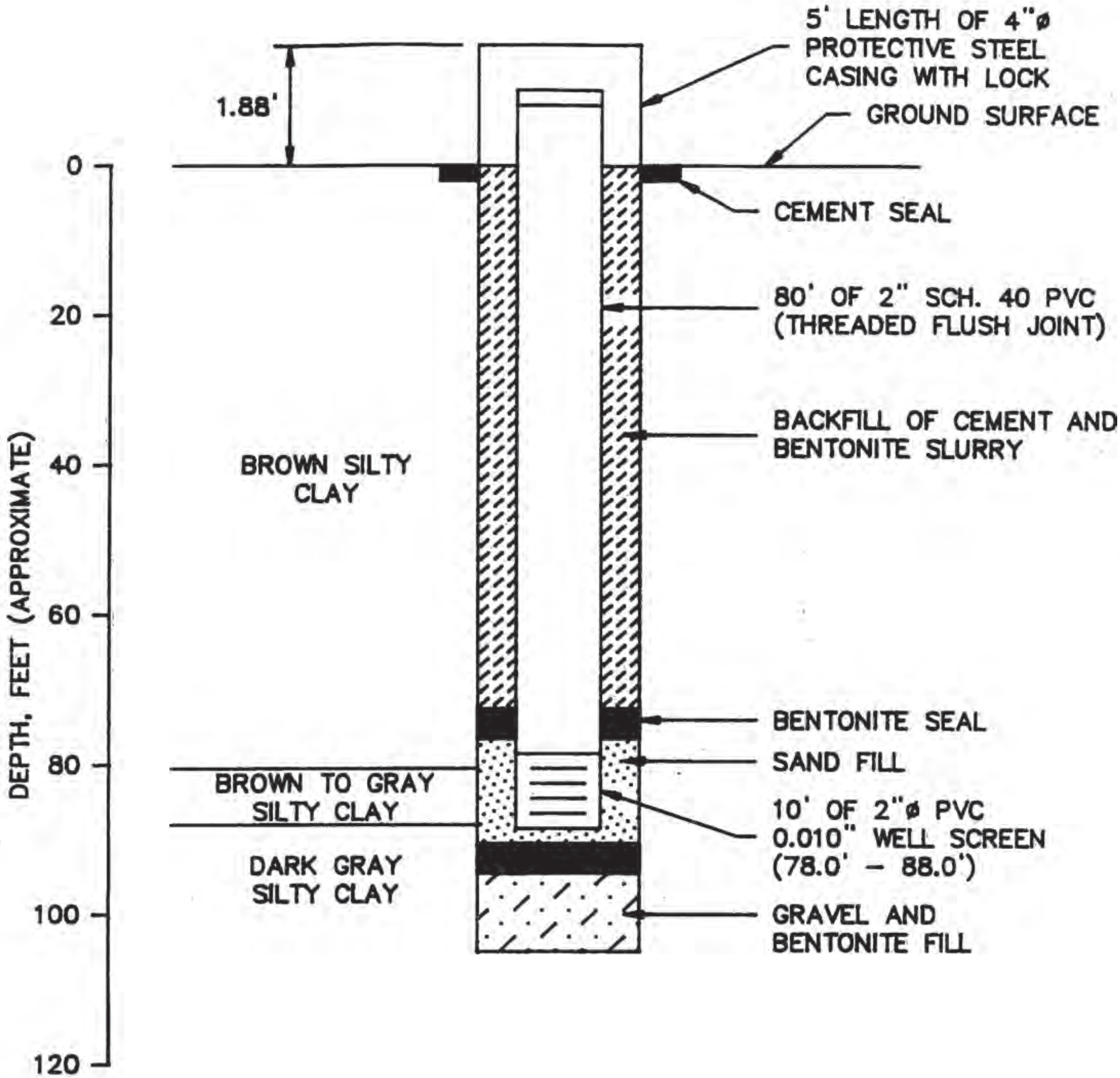


FIGURE 19

MONITORING WELL 32W85
CONSTRUCTION SPECIFICATIONS

PROTECO SITE
PEÑUELAS, PUERTO RICO

FRED C. HART ASSOCIATES, INC.

NOT TO SCALE

TABLE 1

MONITORING WELL CONSTRUCTION SPECIFICATIONS

Well No.	Surveyed Top of Casing Elevation (TOC)	Total Depth	Screened (depth Internal in ft.)	Screen Length	Screen Slot Size	Well Diameter	Casing & Screen Material	Notes
1MW1	260.54	229.0'	214-229'	15'	0.01"	2"ID	PVC	1
2MW1	283.81	240.0'	230-240'	10'	0.01"	2"ID	PVC	1
3MW1	296.50	80.0'	50-80'	30'	0.005"	4"ID	PVC	1
4MW1	342.71	53.0'	39-53'	14'	0.001"	4"ID	PVC	1
9MW1	335.86	57.5'	46-56'	10'	0.001"	4"ID	PVC	1
11MW3	348.53	193.0'	170-193'	23'	0.01"	2"ID	PVC	2
12MW3	287.17	174.0'	158-168'	10'	0.001"	2"ID	PVC	1
14MW5	327.09	42.5'	32.5-42.5'	10'	0.015"	2"ID	PVC	3
15MW5	335.93	66.0	48-58'	10'	0.015"	2"ID	PVC	3
16MW5	350.25	202.5'	131'4"-141'4"	10'	0.01"	2"ID	PVC	3,5
17MW5	413.11	200.0'	---------	---	------	-----	----	4
18MW5	271.71	59.5'	49.5'-59.5'	10'	0.01"	2"ID	PVC	3,5
19MW5	387.19	100.0'	---------	---	------	-----	----	4
20MW5	341.60	210.0'	---------	---	------	-----	----	4
21MW5	257.83	57'8"	47'8"-57'8"	10'	0.01'	2"ID	PVC	3,5
22MW5	304.07	55.0'	45'-55'	10'	0.01'	2"ID	PVC	3,5

KEY:

Note

1. Field constructed well screen made by cutting PVC Pipe with a hacksaw.
2. Well screen located at an incorrect stratigraphic position
3. Commercially manufactured machine slotted well screens.
4. Dry borehole, no well screen or riser piper installed.
5. Monitoring well installed in accordance with phase I work slope well construction specifications.

TABLE 1
REGULATED UNIT MONITORING WELL SPECIFICATIONS

WELL NO.	MONITORED UNIT	SURVEYED ELEVATION (FT) TOP OF CASING	TOTAL DEPTH	SCREENED INTERVAL (FT.)	SCREEN LENGTH (FT.)	SCREEN SLOT SIZE (IN.)	WELL DIAMETER (INSIDE)	CASING MATERIAL	HYDROGEOLOGIC POSITION RELATIVE TO MONITORED UNIT
18M-85	Immobilization Unit TI_3	271.71	59.5	49.5 to 59.5	10	0.01	2 in.	PVC	Downgradient
23M-85	Immobilization Unit TI_3	276.67	39.0	29.0 to 39.0	10	0.01	2 in.	Teflon	Downgradient
30M-85	Immobilization Unit TI_3	279.54	54.0	44.0 to 54.0	10	0.01	2 in.	Teflon	Downgradient
26M-85	Rainwater Lagoon	296.83	69.0	59.0 to 69.0	10	0.01	2 in.	Teflon	Downgradient
28M-85	Rainwater Lagoon	297.33	74.0	64.0 to 74.0	10	0.01	2 in.	PVC	Downgradient
29M-85	Rainwater Lagoon	295.99	33.8	23.8 to 33.8	10	0.01	2 in.	Teflon	Downgradient
22M-85	Rainwater Lagoon and TI_3	304.07	55.0	45.0 to 55.0	10	0.01	2 in.	PVC	Upgradient

SECTION [illegible] TO PREVENT
[illegible]

SECTION F

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SECTION F

PROCEDURES TO PREVENT HAZARDS

This section describes the various procedures used by PROTECO to preclude events that could cause damage to human health and the environment, including general security provisions, facility inspections, preparedness and prevention requirements and handling precautions for ignitable and incompatible wastes. This information is submitted in accordance with the requirements of 40 CFR 270.14(b)(4), (5), (6), (8) and (9), and the Puerto Rico Environmental Quality Board. Other regulations addressed to complete this section include 40 CFR 264.14, 264.15, 264.17, 264.174, 264.194 and 264.226.

F-1 Security Procedures and Equipment [40 CFR 270.14(b)(4)]

It is the intent of PROTECO to keep intruders, livestock, unauthorized personnel, visitors and contractors out of the active portions of the facility so that injury to either humans and livestock does not occur. In providing security measures, PROTECO minimizes the potential for an intruder to cause a release, fire or explosion of waste, mix incompatible wastes, or to damage or disturb the containment and monitoring equipment. PROTECO provides the following measures to ensure the security of the facility:

- 24-hour surveillance system
- artificial and natural barriers

- means to control access
- warning signs.

The following sections describe how PROTECO meets the security objectives required by EPA in 40 CFR 264.14.

F-1a 24-Hour Surveillance System

Security at PROTECO is maintained by a staff of experienced security guards, who primarily monitor the entry and exit to and from the active portions of the facility and provide general security measures within the facility premises.

The only authorized point of entry is at the southern end of the facility where the only access road is located. An eight foot high chain link electric gate topped with three strands of barbed wire is located at this point of entry. This gate is kept closed at all times by the security guards. Access to the facility through this gate by visitors, contractors or transporters of hazardous waste can occur only if security guards have been notified their impending arrival.

The facility is manned by a security guard 24-hours a day, 7 days per week. Guards normally work an 8-hour shift with a crew of 3 guards per day. Once each day, the security guard using a facility vehicle inspects the entire length of the facility premises checking facility equipment, access point, gates and fencing. Once each week, during the operating hours of the facility, a security guard is responsible for inspecting the entire facility premises checking all the fences, gates and warning signs and recording the findings on a PROTECO inspection log.

All day-time and night-time facility guards are supplied with both walkie-talkies and a facility vehicle having radio-telephone gear. This enables the guards to be in continuous contact with the PROTECO Penuelas office. In the event of an emergency, assistance from the police department, fire departments, civil defense, etc. will be sought by telephone from the PROTECO site office.

F-1b <u>Barriers and Means to Control Entry</u>

F-1b (1) <u>Natural and Artificial Barriers</u>. The entire PROTECO facility is surrounded by both fences and natural barriers. There is only one access road leading to the facility. It is surrounded on either side by a 3.5 foot-high, three (3) strand barbed wire fence. Behind this fence are drainage ditches, vegetation including thorn bushes native to the Puerto Rican southern climate and rolling hills. This fence provides adequate control so that livestock kept adjacent to the western perimeter of the facility cannot pass into the facility.

At the entrance to the facility, there is an eight (8) foot-high, chain link gate topped by three (3) strands of barbed wire. This gate is kept locked at all times by the security staff.

The perimeter of the Tank Farm, Container Storage Building and Stabilization/Fixation Facility is surrounded by an eight (8) foot-high, chain link fence topped by three (3) strands of barbed wire.

Drawing B511E-L20 shows the two types of fencing surrounding the facility and the location of the main gate.

F-1b(2) Means to Control Entry. As discussed in Sections F-1a and F-1b(1), entry to the facility is controlled by the security guards and/or lab personnel through the electrically operated gate at the entrance of the only access road to the facility. This gate is kept closed at all times. Drawing B511E-L20 shows the access road onto the site. Only authorized personnel from PROTECO are allowed entrance to the facility.

Access to the facility by visitors, contractors or outside transporters of hazardous waste can occur only if security guards have been notified of their impending arrival.

An entry log (Figure F-1) has been developed and will be used by the facility. All visitors, contractors and/or outside transporters of hazardous waste will be required to sign the log at the PROTECO gatehouse before entering the facility.

FACILITY ACCESS LOG

TIME		NAME	AFFILIATION	FACILITY CONTACT	PURPOSE OF VISIT
IN	OUT				

F-1c Warning Signs

Warning signs which are legible from a distance of 25 feet are posted on the entrance gate, on the guardhouse and at several fence locations around the facility. These signs are visible from all angles of approach, and bear the legend "Danger - Unauthorized Personnel Keep Out". The signs are written in Spanish, which is the native tongue in Puerto Rico (i.e., Peligro Desperdicio Industrial No Se Acergue), and English. The signs have a white background with black lettering that is 2 inches in height. The signs themselves are 12 inches high and 18 inches in length.

No smoking signs which are also legible from 25 feet will be placed on the entrance gate, at various positions around the Containers Storage Facility, throughout the Tank Farm and the Stabilization/Fixation Facility as well as at the Drum Decant Unit and at the entrance to the landfills. Signs are written in either English and Spanish. The signs written in English are for the benefit of any English-speaking visitors and/or contractors visiting the facility as a method to prevent the striking of matches or smoking in hazardous areas. The signs are 18 inches in length and 12 inches in height.

F-1d Waiver

PROTECO does not request a waiver from the requirements stated in 40 CFR 264.14(a)(1) and (2) with regard to injury to intruder or violation by intruder.

F-2 Inspections [40 CFR 270.14(b)(5)]

F-2a General Inspection Requirements

A facility that treats, stores or disposes of hazardous waste is required by 40 CFR 264.15 to develop and follow a written inspection schedule.

Inspections of the PROTECO facility are conducted by facility personnel to prevent and/or detect malfunctions and deterioration of equipment, operator errors and/or discharges which would lead to the releases of hazardous waste to the environment or a threat to human health. PROTECO utilizes the inspection plans delineated herein to (1) minimize the potential for release of hazardous waste to the environment and to (2) ensure that the facility does not pose a threat to human health.

Table F-1 presents the PROTECO schedule for inspecting the facility treatment, storage or disposal operations, the safety and emergency equipment and the security devices. Each inspection that is conducted is recorded on an inspection log specific to the area inspected and includes the following information:

- the date and time of the inspection
- the name of the inspector
- a notation of the observations made
- the date and nature of all remedial action taken.

F-2b Inspection Activities for Safety and Emergency Equipment

The PROTECO emergency coordinator or his alternate inspect the safety and emergency equipment at least once each month and after every time it is used in an emergency situation. Table F-1 describes the safety and emergency equipment and the items that are to be checked during the inspection. A copy of the monthly inspection log used by the facility to inspect the safety and emergency equipment is provided in Appendix F.1. Appendix G-3 in Section G provides a copy of the checklist the emergency coordinator uses to inspect and certify the condition of the emergency and safety equipment after it has been used during an emergency situation. Based on the inspection results, the emergency coordinator has the equipment repaired, decontaminated or orders new stock and/or replacement parts.

F-2c Inspection Activities for Security Devices

The facility security guards are responsible for inspecting the facility fences, gates, warning signs and the security staff walkie-talkies and radio-telephone equipment on a weekly basis as described in the schedule provided in Table F-1. The security guards will complete a security device inspection log (shown in Appendix F.1) and turn it in to the PROTECO facility office each week. A copy of this log is to be kept by the facility for three years.

Table F-1

INSPECTION SCHEDULE

Area/Equipment	Specific Item	Type of Problems	Frequency of Inspection
Safety and emergency equipment	Standard absorbents (Vermiculite, etc)	Depleted stock	Monthly/as needed
	Absorbent boom	Depleted stock	Monthly/as needed
	Absorbent pads	Depleted stock	Monthly/as needed
	Containment drums	Corrosion, structual damage, depleted stock	Monthly
	Emergency shower and eyewash	Water pressure, leaking, drainage	Weekly
	Face shields and goggles	Broken or dirty depleted stock	Monthly
	Chemical cartridge respirators	Spent chemical adsorbent, seals, depleted stock, torn	Weekly
	Fire extinguishers	Needs recharging	Monthly/after each use
	First aid equipment	Items out of stock or inoperative	As used
	Protective clothing	Holes, wear and tear, depleted stock	As used
	Decontamination facility (showers)	Water pressure, leaking, drainage	As used
Security devices	Facility gates	Corrosion, damage to chain-link fence or barbed wire, locks broken	Weekly
	Facility fences	Corrosion, damage to chain-link fence or barbed wire fences	Weekly
	Two-way radios/walkie-talkies	Transmitter or receiver damaged	Weekly
	Warning signs	Missing, damaged signs	Weekly
Container storage area	Container placement	Wrong storage area, number of containers in each storage area	Weekly
	Sealing of containers	Open lids, damage, bungs missing	Weekly
	Labeling of containers	Improper identification	Weekly
	Containers	Corrosion, leakage, structural defects	Weekly
	Segregation of incompatible wastes	Storage of incompatible wastes in same area	Weekly
	Base or foundation	Cracks, spalling, uneven settlement, erosion, wet spots	Weekly
	Warning signs	Missing, damaged signs	Weekly
	Loading/unloading areas	leakage, spills	daily/as needed
	Below ground secondary containment tanks	Contains Liquids	Weekly

Table F-1 (CONTINUED)

INSPECTION SCHEDULE

Area/Equipment	Specific Item	Type of Problems	Frequency of Inspection
Container Storage Area	Grating over drain pipes	Clogging	Weekly
	Below ground piping	Clogging	Monthly
Tank storage area	Level of wastes (sufficient freeboard)	Splashing, overflows	Daily
	Ground surface	Cracks, deterioration, wet spots	Weekly
	Base or foundation	Cracks, spalling, uneven settlement, erosion, wet spots	Weekly
	Pipe connections	External corrosion, cracks, distortion	Weekly
	Tank shell	Corrosion, discoloration, cracks, buckles, bulges	Weekly
	Tank bottom	Corrosion, discoloration, cracks, buckles, bulges	Weekly
	Protective coating	Corrosion, deterioration	Weekly
	Internal supports	Deterioraiton, depressions	Yearly
	Nozzles and joints	Cracking, corrosion	Weekly
	Tank valves	Cracks, closure, rusting	Weekly
	Load/unloading areas	spills	daily/when used
	Overflow/overfilling control device	Clogging, inoperative valves	daily/when used
Tanks, Internal	Preliminary visual Inspection	Roof	See Section F-2d
		Internal supports	See Section F-2d
		Walls	See Section F-2d
		Bottom	See Section F-2d
		Obvious areas of damage	See Section F-2d
	Roof & Structural Members	Thickness	See Section F-2d
		Corrosion, cracking	See Section F-2d
		Seals	See Section F-2d
		Liner crazing	See Section F-2d
	Tank Walls	Cracking, corrosion	See Section F-2d
		Liner crazing	See Section F-2d
		Connection joints & gasket integrity	See Section F-2d
		Bulges, swelling, spalling	See Section F-2d
		Knuckle area integrity	See Section F-2d
		Floor seals	See Section F-2d
		Thickness	See Section F-2d

Table F-1 (CONTINUED)

INSPECTION SCHEDULE

Area/Equipment	Specific Item	Type of Problems	Frequency of Inspection
Tanks, Internal (cont'd)	Tank Bottom	Corrosion, deterioration (visually & by hammering)	See Section F-2d
		Depressions, uneven settling	See Section F-2d
		Spalling, cracking	See Section F-2d
		Liner crazing	See Section F-2d
		Seals and seams	See Section F-2d
	Fluid Level Detectors	Corrosion, Wear or damage	See Section F-2d
		Operational status	See Section F-2d
	Leakage	Tank Bottoms, Connections & Joints	See Section F-2d
Surface impoundment during construction phase	Construction phase	Observe equipment and execution, check depths width, height, compare to plan specifications	Daily
	Berms and dikes	Height and thickness, compare to plan specifications	Weekly
	Liner	Shipping damage, off-specification item	At receipt
	End of construction	Cracks, holes, tears, compare to plan specifications	At completion of construction
	Final cover, subbase, leak detection system	Lenses, cracks, channels, structural non-uniformity, foreign materials, compare to plan specifications	Upon completion
Surface impoundments, after construction during facility operation	Liquid level	Freeboard level over 2 ft, sudden change in liquid level, freeboard slope	Daily/after storms
	Dikes	Erosion, cracking, settling, uplift wet spots, leaks or other signs of leaking	Weekly/after storms/ as used
	Vegetation	Erosion of soil, deterioration, wet spots, signs of vegetation damage	Weekly/after storms
	Discharge hoses and connections	Cracking, fittings for signs of leaks, wet spots, other signs of deterioration	During and after each use

Table F-1 (CONTINUED)

INSPECTION SCHEDULE

Area/Equipment	Specific Item	Type of Problems	Frequency of Inspection
Surface Impoundments	Run-on diversion ditch	Obstruction of flow, bank erosion, ponding vegetation stress	Weekly/after storms
	Run-off diversion canal and drain	Obstruction to flow, bank erosion, drain clogs, capacity, structural integrity, ponding, vegetation stress	Weekly/after storm
	Entrance road	Loss of gravel, deterioration of soil, excessive odors	Weekly/after storms
	Leak detection system (when applicable)	Observation or evidence of liquid, pump operation, component integrity	Weekly/ after storms
	Survey dikes	Movement & settlement of structure	Annually
Immobilization facilities during construction phase	Construction phase	Observe equipment and execution, check depths width, height, compare to plan specifications	Daily
	Berms and dikes	Height and thickness, compare to plan specifications	Weekly
	Liner	Shipping damage, off-specification items	At receipt
	End of construction	Cracks, holes, tears compare to plan specifications	At completion of construction
	Final cover, subbase leak detection system	Lenses, cracks, channels, structural non-uniformity, foreign materials, compare to plan specifications	Upon completion
Immobilization facilities after construction, during facility operation	Run-on diversion ditch	Obstruction to flow, bank erosion, capacity, structural integrity, ponding, vegetation stress	Weekly/after storms
	Run-off diversion canal and drain	Obstruction to flow, bank erosion, drain clogs, capacity, structural integrity, ponding, vegetation stress	Weekly/after storm
	Leak detection systems (when applicable)	Observation or evidence of liquid, pump operation, component integrity	Weekly/after storms
	Entrance road	Loss of gravel, deterioration of soil due to storms, excessive odors	Weekly/after storm

Table F-1 (CONTINUED)

INSPECTION SCHEDULE

Area/Equipment	Specific Item	Type of Problems	Frequency of Inspection
Immobilization Facilities	Vegetation	Erosion of soil, deterioration of vegetation wet spots	Weekly/after storms
	Dikes	Erosion, cracking, settling, wet spots leaks or other signs of leaking, uplift	Weekly/after storms
	Discharge hoses and connections	Cracking, fittings for signs of leaks, wet spots, other signs of deterioration	Weekly/after storms
	Survey dikes	Movement and settlement of structure	
Monitoring Water Wells Aboveground	Locks	Tampering, rust	Weekly
	Concrete block	Cracking, pitting, flaking	Weekly
	Hinged cover	Tampering, holes	Weekly
Trucks	Tires	Cuts in tread, lower pressure	Weekly
	Brakes	Low brake peddle pressure	As prescribed in maintance manual/min
	Hydraulics	Leaks in system broken lines	As prescribed in maintance manual/min
	Trailer Hitches	Broken wires metal fatigue	each time of use
	Lights - running/emergency	defective bulb, relay, short wiring	each time of use
	Horns/sirens	defective bulb, relay, short wiring	each time of use
	Engine condition	Loss of power	as prescribe in maintance manual

F-2d Inspection Activities for Container Storage Facility

Inspections of the container storage facility will be conducted per the inspection schedule provided in Table F-1. The problems encountered with each specific item (described in Table F-1) shall be noted on the appropriate log sheets. The inspector (i.e., PROTECO chemist or his designated representative) is required to complete both a container storage area inspection log and a tank storage area inspection log every week.

Information provided on the log sheets includes the inspector's name, date and time of inspections, observations made and the date and nature of any repairs or remedial action. A copy of each of these log sheets are provided in Appendix F.1.

The inspector is required to visually check the status of each item and make notations on abnormal conditions. The facility manager will review the inspector's comments, conduct a follow-up inspection of the area noted and determine what maintenance work is needed to correct the problem. Inspectors are also required to observe and note in the container storage area the number of containers, aisle space, inventory quantities and condition of the containers. In the tank storage area, the inspector is required to observe and note the quantity of waste in each tank on a daily basis and the condition of the tank and base on a weekly basis. If the status of a particular item is unacceptable, an appropriate repair schedule shall be implemented or remedial action initiated by the emergency coordinator to preclude a hazard to either human health or the environment.

F-2e Inspection Activities for Tank Farm

Tank inspection program will constitute annual visual inspection of the stainless steel and fiberglass reinforced plastic (FRP) tanks and non-destructive and destructive testings of the carbon steel tanks, as follows: Visual inspection of the tank internal and external surfaces including fittings, will be performed annually. Coupon testing will be performed on the base plate every five years. The inspection log sheets for all the tanks will be interpreted by Registered Professional Engineers.

Where the results warrant it, ultrasonic testing would also be performed. If the tank integrity is determined to be at risk due to excessive corrosion, the tanks would be taken out of service. Depending on the corrosion characteristics and location; i.e. random pitting, localized corrosion, or uniform corrosion, a decision would be made by facility management on whether or not to replace, repair, line the tank. It will only be returned to service if certified by the Professional Engineer as safe for waste storage. All tank entry and inspection procedures are per the American Petroleum Institute (API) "Guide for Inspections of Refinery Equipment" guidelines.

F-2f Inspection Activities for the Surface Impoundments

Surface impoundment inspections are conducted as described in the schedule provided in Table F-1. The inspections are conducted by either the field supervisor, operation supervisor, the facility chemist or other appropriately trained personnel each week and after every storm of extended duration. The results of the inspection of each impoundment are recorded on separate log sheets entitled "Surface Impoundment Inspection Log Sheet", as depicted in Appendix F.1. In addition, freeboard levels of each impoundment are recorded daily on a log sheet entitled "Daily Free-board Inspection Log", as depicted in Appendix F.1

Typical problems encountered with each specific item (as noted in Appendix F.1) are recorded on the log sheets. The inspector is required to check the status of each item. Inspectors are required to inspect the entire perimeter of the surface impoundments checking for signs of deterioration and leakage. The facility manager will review the inspector's comments, conduct a follow-up inspection of the area noted and determine what maintenance work is needed to correct the problem.

F-2g Inspection Activities for Landfill Facilities

Inspections of the landfill facilities are conducted as described in the schedule provided in Table F-1. The results of each inspection will be recorded on log sheets entitled "Landfill Inspection Log" as depicted in Appendix F.1. Information on the log sheets includes the inspector's name, date and time of inspection, observations made and the date and number of any repairs made or remedial actions taken. The inspections are conducted every week and after storms of extended duration by either the field supervisor, operations supervisor or the facility chemist, or other appropriately trained personnel.

Typical problems encountered with each specific item (as noted in Table F-1) are to be noted on the log sheets. The inspector is required to check the status of each item. Inspectors are to make observations on the stormwater management systems, leachate and leak detection systems where applicable, entrance roads and liner and capping systems. The inspector will remove the leachate and leak detection system manhole covers and look into the manholes to determine if liquids are present. The facility manager will review the inspector's comments, conduct a follow-up inspection of the area noted and determine what maintenance work is needed to correct the problem.

F-2h <u>Inspection Activities during Construction</u>

During construction of the landfills, the quality assurance plans for soil and liner placement (Appendices D-6.3 and D-6.6, respectively) will be followed. These quality assurance plans provide an inspection schedule for each phase of installation, as well as final inspection and certification before the unit is placed in operation.

F-2i <u>Inspection of the Groundwater Monitoring Wells</u>

The facility security guards are responsible for inspecting the above-ground sections of the monitoring wells and surface area around the wells. The security guards will complete a monitoring well inspection log and turn it into the PROTECO facility each week. A copy of this log is to be kept by the facility for three years.

During the inspection, the well locks, concrete block, hinged cover and surface area around the well will be inspected for signs of tampering (i.e., well is still in place, no holes, scratches or abrasions), deterioration (erosion of soil away from the well, cracks in concrete, rust on the lock, well casing or hinged door). A copy of the monitoring well inspection log is provided in Appendix F.1.

Typical problems encountered with each specific item (as noted in Table F-1) are to be noted on the log sheets. The inspector is required to check the status of each item. The facility manager will review the inspector's comments, conduct a follow-up inspection of the area noted and determine what maintenance work is needed to correct the problem.

F-2j Remedial Action

If inspections reveal that non-emergency maintenance is needed, it will be completed as soon as possible to preclude further damage and reduce the need for emergency repairs. The inspector will complete a requisition form for the repair(s) and submit it to the General Manager. The General Manager will then initiate the necessary corrective measures. If a hazard is imminent or has already occurred during the course of an inspection or any time between inspections, remedial action will be taken immediately. PROTECO personnel will notify the appropriate authorities (i.e., emergency coordinators) as per the Contingency Plan (see Section G) and remedial actions will be initiated. In the event of an emergency involving the release of hazardous constituents to the environment, efforts will be directed towards containing the hazard, removing it and subsequently decontaminating the affected area.

F-2k Inspection Log

The inspection logs that are completed for each of the specific areas or equipment listed in the inspection schedule will be maintained for each calendar year in three-ring binders that are subdivided by sections for each specific operational area. Information contained in the logs include date and time of inspection, name of inspector and a notation of the observations made. If remedial actions are taken, they are also described in the log. A copy of each inspection log sheet used by the facility are provided in Appendix F.1, as discussed. After an inspection, each log sheet is filed in the binder according to area/equipment, which provides a case history on a particular item. The inspection log notebooks are kept with a copy of the inspection schedule in the Lab Manager's office. As required, records of inspections shall be kept for a minimum of three years from the date of inspection.

F-21 Structural Integrity

The structural integrity of each unit will be certified before any hazardous waste operations are started at that unit. For the landfills, the structural integrity will be verified following the quality assurance documents for Soil and Membrane Liner Installation (Appendix D-6.6 and D-6.3, respectively).

F-3 Waiver of Preparedness and Prevention [40 CFR 270.14(b)(6)]

PROTECO does not wish to request a waiver of preparedness and prevention requirements under 40 CFR 264 Subpart C.

F-3a Equipment Requirement

All fire equipment is maintained and checked in accordance with manufacturer's requirements. When fire equipment is used, it will be sent to the supplier for refilling or replacement. Each on-site vehicle has a five pound dry chemical fire extinguisher, Class A, B and C.

Drawings B511-D-BL20 and B511-D-BL21 shows the location of fire extinguishers in the stabilization facility. Drawing B511-C-FD2 shows the location of fire equipment in the tank farm. Drawing B511-C-FP1 shows the location of fire equipment in the container storage area. It should be noted that the Stabilization/Fixation Facility Tank Farm and Container Storage Facility are served by a fire sprinkler/hydrant system, shown in the drawings. Inspection logs for all of these items can be found in Appendix F.1.

F-3b Aisle Space Requirements

The proposed Container Storage Facility is designed with a main aisle spacing of sixteen feet. Secondary aisle spacing in the Container Storage Facility is five feet between rows of containers. These spacings allow for movement of personnel and equipment between rows of containers and provide access to all containers stored in the facility.

F-4 Preventative Procedures, Structures and Equipment [40 CFR 270.14 (b)(8)]

F-4a Loading and Unloading Operations [40 CFR 270.14(b)(8)(i)]

F-4a(1) Proposed Container Storage Area. Unloading operations at the future container storage area will involve the transport of wastes in containers from generators via flat-bed truck. However, the waste containers will be lowered from the truck by either the hydraulic lift or by use of a forklift. The forklift will be used when there are only a few containers holding each specific waste type, otherwise the waste containers will be lowered to the ground using the hydraulic lift. Then, using the fork lift, the waste containers will be placed on (maximum of four containers to a pallet) before they are moved into the appropriate storage section in the future container storage area. The pallets holding the containers will be moved into the storage building using the fork lift.

Several precautions will be taken to reduce the potential for hazards during unloading operations at the future container storage area. First, a concrete ramp will be designed and constructed at the entrance of the future container storage area to facilitate the smooth and accessible movement of the forklift truck in and out of the storage area sections. Second, sixteen feet main aisle spaces will be maintained at all times. Secondary aisle spaces of five feet will also be maintained. These aisles will be kept clean so that no obstructions will be across or in aisles that could create a hazard to human health or the environment. Third, pallets will be used in the transport of containers. Fourth, fire equipment will be located near the unloading areas.

Loading operations at the facility take place in the container storage area. After obtaining a waste movement form (WMF) from the PROTECO lab, wastes stored in the container storage area are transported to the various treatment facilities via front-end loader. During this loading operation a spill of a waste is unlikely due to operator training and proper supervision. However, in the event of an accident the spill or leak from a drum would be contained in the front-end loader bucket. The front-end loader would be moved to the appropriate treatment area where the spilled waste and any cleanup materials generated from the spill would be added to one of the treatment processes and treated/disposed of as a hazardous waste. The front-end loader and any other equipment used will be decontaminated before loading operations are continued.

Ramps are provided at the entrance of all treatment areas to facilitate access of the front-end loader in and out of the treatment areas. Once the front-end loader arrives at the appropriate treatment area, the bucket is lowered and the containers are carefully removed by the PROTECO operating personnel.

F-4a(2) Proposed Decant Facility. Prior to the transfer of any wastes at the Decant Facility, Storage Bay 18 in the Container Storage Facility, the waste will be analyzed as per Section C-3, the Waste Analysis Plan, to ensure compatibility with any other containers temporarily transferred to Bay 18. A maximum of two 55-gallon containers, or an equivalent volume, will be transferred to this facility at one time to allow sufficient mobility of employees and equipment in the area. The unloading or decanting of these containers will take place through waste class specific piping. The decanting pump will be decontaminated between pumping of incompatible waste classes. A further description of the loading and unloading practices followed in this unit is given in Section D-3.

F-4a(3) Proposed Tank Farm. The Tank Storage and Treatment Facility design incorporates several features to prevent uncontrolled release of hazard waste during the loading and unloading of tanks. These features are:

- Truck unloading takes place on an epoxy coated concrete pad surrounded by a curb and sloped to a catch basin.

- For major spills, the truck unloading catch basin is gravity drained to the Stormwater Retention Surface Impoundment.

- Secondary containment is provided around the base of each tank.

- Locked filler caps on the tanks prevent overfilling since the filling process involves inventory reconciliation by operations personnel before any unloading into a tank can take place.

- Automatic level indicators and high level alarms prevent overfilling.

F-4b Runoff [40 CFR 270.14(b)(8)(ii)]

F-4b(1) Proposed Container Storage Area. The proposed container storage facility will consist of an impervious concrete base at least six inches thick. The base will have a one percent slope towards separate floor drains and sumps in 16 separate storage bays. The proposed container storage bays within the building will be separated by concrete walls which surround each section and prevent runoff from leaks or spills. All liquids which reach the base will flow to the respective

The entire container storage area will be covered by a building. The building will divert any direct rainfall and therefore prevent precipitation from contacting the drums in the storage area. Because no precipitation can come into contact with the waste, no runoff of hazardous waste located within the building will occur.

F-4b(2) Proposed Decant Facility. The run-on/run-off prevention features for the decant facility are the same design as the Container Storage Facility since the Decant Unit is housed in the container storage building.

F-4b(3) Proposed Tank Farm. Run-on is prevented in the Tank Farm by six inch curbing around each tank. This curb also prevents run-off from being discharged from the tank area. Instead, any run-off is transferred to the Stormwater Retention Surface Impoundment.

F-4c Water Supply [40 CFR 270.14(b)(8)(iii)]

F-4d Equipment and Power Failure [40 CFR 270.14(b)(8)(iv)]

The PROTECO facility will have a back-up generator to compensate for any power failures which may occur at the site. This 480 volt, three phase power emergency generator will be connected to the following emergency systems:

- Fire Pump
- Key lighting throughout the site
- Level alarm systems for all on-site tanks.

In the case of a power failure, all unnecessary hazardous waste operations will be halted. Start-up of these operations will occur only by order of the site general manager.

F-4e Personnel Protection [40 CFR 270.14(b)(8)(v)]

PROTECO takes several measures to prevent undue exposure of facility personnel to hazardous waste. First, PROTECO will obtain chemical fact sheets on any of the hazardous wastes treated, stored or disposed of at the facility. These fact sheets provide information on the health hazards, toxicology, fire and explosion hazards, containment and cleanup procedures for fires or spills and first aid. These sheets are reviewed with operating personnel during initial and annual personnel training classes held by PROTECO.

All personnel are required to wear hard hats, safety shoes (boots) and glasses while on active portions of the site. The type and quantity of available protective equipment to be used in case of a spill, leaking drum or an emergency situation is listed in detail under the Contingency Plan (see Section G). Use of personnel protective equipment is covered in initial and annual personnel training (Section H).

F-5 Prevention of Reaction of Ignitable, Reactive and Incompatible Waste [40 CFR 270.14(b)(9)]

A number of waste handling procedures are utilized by PROTECO to preclude the occurrence of a hazardous reactions occurring at the facility that could cause harm to human health or the environment. The reactions that must be prevented included the following:

- generation of extreme heat, pressure, fire, explosion or violent reactions
- production of uncontrolled flammable fumes, dusts or gases in significant quantities to threaten human health or the environment
- production of uncontrolled flammable fumes or vapors in sufficient quantities to pose risk of fire or explosion
- damage to structural integrity of the containment devices or the facility

F-5a Precautions to Prevent ignition or Reaction of Ignitable or Reactive Wastes

PROTECO does not accept reactive wastes for treatment, storage or disposal at the facility. As a preventive measure, all wastes that might exhibit the potential for reactivity will be analyzed by the PROTECO laboratory before acceptance of a waste movement to determine if the waste is reactive (see Section C). If the wastes are reactive, PROTECO does not accept the waste movement. The movement is returned to the generator and thereby, the potential of a reactive waste causing an explosion or unanticipated reaction at the facility is eliminated.

Ignitable wastes are accepted by PROTECO for treatment, storage or disposal. These wastes are stored in containers in the Container Storage Facility while awaiting treatment. Ignitable wastes are also stored in the Halogenated and Non-Halogenated Solvent Tanks at the facility. Ignitable wastes are treated and disposed of by PROTECO in the Stabilization/Fixation facility, or by off-site shipment for burning or incineration. Ignitable wastes to be stabilized/fixed are subject to testing to assure the process can be conducted safely (as per Section C).

Additionally, electrical wiring and appurtanences in the following areas are designed for explosion-proof service (per the applicable National Electric Code):

Container Storage Facility
Tank Farm Storage/Treatment Facilities
Stabilization/Fixation Facility

Signs with the legend "No Smoking" are posted in the container storage area, entrance to the landfill, tank farm stabilization/fixation facility and at the drum decant unit to prevent any employee, contractor or visitor from smoking or striking matches in an area where ignitable wastes are handled. The procedures used in managing containers holding ignitable wastes and the handling procedures used at the facility are discussed in the following sections.

F-5b General Precautions for Handling Ignitable Wastes or Accidentally Mixing Incompatible Wastes

Precautions taken by PROTECO to handle ignitable wastes in a safe manner (to prevent accidental release, fire, or explosion) include employee supervision, weekly facility inspections, grounding of containers, elimination of ignition sources and container segregation techniques.

PROTECO assures waste to container compatibility by providing generators with container compatibility information during the generator audit and reviewing container storage methods during the waste preacceptance review phase (see Section C-5). Second, when containers are received in a waste movement, they are inspected by the facility chemist or other appropriately trained personnel to determine that there are no signs of leaks, spills or container deterioration.

Containers are kept closed while in the storage area unless opened for sampling or waste transfer. Prior to opening a metal container holding ignitable wastes to take samples, operating personnel will ground the container. In addition, only non-sparking tools (brass hammers, wrenches, etc.) are used to open or close these containers.

PROTECO takes precautions to ensure that all ignition sources (e.g., open flames, sparks) are eliminated from all ignitable waste treatment areas and the container storage area. Warning signs with the legend "No Smoking" are posted in all areas where ignitable wastes may be present to warn any contractors and visitors of the hazards in the area.

Also, all piping for decant and tank farm operation is separate for each waste class, such that mixing cannot occur due to misvalving. Al waste classes are color coded in identification as:

Tanks
Piping
Containers in Storage
Waste Movement Forms

Finally, parts for discharge of liquids are also color coded and locked per individual keys as described in Section C.

Incompatible wastes are strictly segregated in the drum storage area. Incompatible wastes are not mixed with other wastes by PROTECO.

F-5c Management of Ignitable Wastes in Containers

Precautions taken in the drum storage area to prevent accidental fire or explosion include proper storage of containers (e.g., stacking, aisle space, labeling and sealing of containers), dikes and appropriate warning signs.

Prior to accepting containers holding hazardous waste for treatment, storage or disposal PROTECO assures that the container is sealed, marked and labeled as required under 40 CFR 262. The labels are checked because they identify the point of generation, the contents of the container, the EPA code number, the date the wastes were generated and any dangers the waste could exhibit.

PROTECO stores ignitable wastes in the drum storage area in accordance with Occupational Safety and Health Administration (OSHA) regulations and NFPA Code. The proposed container storage area was designed to meet NFPA codes. Signs with the legend "No Smoking" are posted at the entrance of the drum storage area and sources of ignition, such as open flames or sparks, are not allowed in these areas.

Containers are stored on pallets to minimize contact with precipitation, leaks or spills, and ignitible wastes are never stacked more than one container high. A minimum of 5 feet is maintained in the aisles and a minimum of 4 feet will be maintained in the proposed exiting area to allow access of personnel, handling equipment and emergency equipment. The proposed area will be located at least 50 feet as is required by the NFPA code and which meets the requirements of the RCRA regulations. The containers are stored in such a way so as to permit approach of fire control apparatus under all weather conditions (less than 200 feet from the access road) as required by NFPA.

F-5d Management of Incompatible Wastes in Containers

As described above, prior to accepting containers holding hazardous wastes for treatment, storage or disposal, PROTECO assures that the container is sealed, labeled and marked. Wastes stored in the existing container storage area are segregated into separate storage bays.

Containers are inspected when they are received at the facility for signs of leaks or spills, container deterioration or pressurization. Should a waste need to be transferred from a container due to deterioration or leakage, PROTECO will use a container that is compatible with the waste. The containers are kept closed at all times and are opened on for sampling or decanting.

Incompatible wastes are strictly segregated in the container storage facility bays and are never mixed, treated or disposed of together by any PROTECO operating personnel. Decanting operations take place by waste class only.

APPENDIX F-1

FACILITY INSPECTION SHEETS

FIGURE 1

PROTECCION TECNICA ECOLOGICA, INC.
SAFETY AND EMERGENCY EQUIPMENT INSPECTION LOG

Items to be Inspected	Date and Time	Name of Inspector	Observations and Remedial Action Taken
Absorbents Note amount on hand			
Absorbent Booms/Pads Note amount on hand			
Containment Drums Note amount on hand			
Eyewash Stations Check for water pressure, leaking, drainage			
Face Shields/Goggles Check for broken, dirty, amount on hand			

FIGURE 1 (CONTINUED)

PROTECCION TECNICA ECOLOGICA, INC.
SAFETY AND EMERGENCY EQUIPMENT INSPECTION LOG

Items to be Inspected	Date and Time	Name of Inspector	Observations and Remedial Action Taken
Cartridge Respirator Check for broken, dirty, replace parts, spent chemical absorbent			
Fire Extinguishers Check by NFPA Standards			
First-Aid Equipment Check for items out of stock or inoperative			
Protective Clothing Check for holes, tears, dirty, check stock			
Showers Check for water pressure, leaking, drainage			

(0554B-2)

FIGURE 2

PROTECCION TECNICA ECOLOGICA, INC.
SECURITY DEVICES INSPECTION LOG

Items to be Inspected	Date and Time	Name of Inspector	Observations and Remedial Action Taken
Chain-Link Fence Inspect for corrosion, damage to chain-links or strands of barbed wire			
Barbed Wire Fence Inspect for corrosion, damage to barbed wire or wooden posts, fence still in place			
Warning Signs Inspect for corrosion, signs still in place, legibility			
Gates Inspect for corrosion, damage to chain-links or barbed wire strands; corrosion to lock, sticking			

(0554B-3)

FIGURE 2 (CONTINUED)

PROTECCION TECNICA ECOLOGICA, INC.
SECURITY DEVICES INSPECTION LOG

Items to be Inspected	Date and Time	Name of Inspector	Observations and Remedial Action Taken
Walkie-talkies and Radio-telephone Inspect to determine if equipment can transmit and receive			

FIGURE 4

PROTECCION TECNICA ECOLOGICA, INC.
CONTAINER STORAGE AREA INSPECTION LOG

Items to be Inspected	Date and Time	Name of Inspector	Observations and Remedial Action Taken
<u>Container Placement</u> Inspect for wrong storage area, incompatible wastes, number of containers in each area			
<u>Container Seals</u> Inspect for open lids, bungs missing, damage to lids			
<u>Container Marking</u> Inspect for improper labels, labels or markings faded, labels damaged or missing			
<u>Containers</u> Inspection of containers for leaks, deterioration, pressurization, structural defects			

FIGURE 4 (CONTINUED)

PROTECCION TECNICA ECOLOGICA, INC.
CONTAINER STORAGE AREA INSPECTION LOG

Items to be Inspected	Date and Time	Name of Inspector	Observations and Remedial Action Taken
Base/Foundation Inspect for cracks, spalling, erosion, wet spots, settlement			
Warning Signs Inspect for signs missing or damaged			
Base/Foundation Inspect for cracks, spalling, erosion, set spots, settlement			
Tank Shell and Bottom Inspect for corrosion, wet spots, cracks, buckles, bulges, discoloration			

FIGURE 4 (CONTINUED)

PROTECCION TECNICA ECOLOGICA, INC.
CONTAINER STORAGE AREA INSPECTION LOG

Items to be Inspected	Date and Time	Name of Inspector	Observations and Remedial Action Taken
Tank Valves, Nozzle, Joints Inspect for cracks, corrosion closure			
External Supports Inspect for cracking, corrosion			
Ground Surface Inspect for cracks, deterioration, wet spots			
Pipe Connections Inspect for external corrosion, cracks, distortion			

FIGURE 6

PROTECCION TECNICA ECOLOGICA, INC.
SURFACE IMPOUNDMENT INSPECTION LOG

Inspector's Name: ______________ Date: _______ Time: _______ Name of Impoundment: ______________

Item to be Inspected	Status Acceptable/Unacceptable	Observations Made	Remedial Actions/ Taken and Date
Liquid Level Check freeboard, freeboard slope, changes in liquid level, give date and status			
Dikes/Berms Check for structural integrity, erosion, cracking, leaks, wet spots			
Vegetation Erosion, deterioration wet spots, signs of vegetation damage			

(0554B-8)

FIGURE 6 (CONTINUED)

PROTECCION TECNICA ECOLOGICA, INC.
SURFACE IMPOUNDMENT INSPECTION LOG

Inspector's Name: ______________ Date: ______ Time: ______ Name of Impoundment: ________________

Item to be Inspected	Status Acceptable/Unacceptable	Observations Made	Remedial Actions/ Taken and Date
Discharge Hoses/Connections Check connections, cracking in hose, signs of leaks, other signs of deterioration			
Run-on Diversion Ditch Obstruction of flow, bank erosion, ponding, vegetative stress			
Runoff Diversion Drain Obstruction of flow, bank erosion, ponding, vegetative stress			

(0554B-9)

FIGURE 6 (CONTINUED)

PROTECCION TECNICA ECOLOGICA, INC.
SURFACE IMPOUNDMENT INSPECTION LOG

Inspector's Name: ______________ Date: ______ Time: ______ Name of Impoundment: ______________

Item to be Inspected	Status Acceptable/Unacceptable	Observations Made	Remedial Actions/ Taken and Date
Entrance Road			
Loss of gravel, deterioration of soil, excessive odors			
Leak Detection System			
Observation or evidence of liquid, pump operation, component integrity			

FIGURE 7

PROTECCION TECNICA ECOLOGICA, INC.
LANDFILL FACILITY INSPECTION LOG

Inspector's Name: ____________ Date: ______ Time: ______ Name of Impoundment: ____________

Item to be Inspected	Status Acceptable/Unacceptable	Observations Made	Remedial Actions/ Taken and Date
Dikes/Berms Check for structural integrity, erosion, cracking, leaks, wet spots			
Vegetation Erosion, deterioration wet spots, signs of vegetation damage			
Discharge Hoses/Connections Check connections, cracking in hose, signs of leaks, other signs of deterioration			

FIGURE 7 (CONTINUED)

PROTECCION TECNICA ECOLOGICA, INC.

Inspector's Name: ________ Date: ______ Time: ______ Name of Impoundment: ________

Item to be Inspected	Status Acceptable/Unacceptable	Observations Made	Remedial Actions/ Taken and Date
<u>Run-on Diversion Ditch</u> Obstruction of flow, bank erosion, ponding, vegetative stress			
<u>Runoff Diversion Drain</u> Obstruction of flow, bank erosion, ponding, vegetative stress			
<u>Entrance Road</u> Loss of gravel, deterioration of soil, excessive odors			
<u>Leak Detection System</u> Observation or evidence of liquid, pump operation, component integrity			

SECTION 6 - CONTINGENCY PLAN

SECTION G

CONTINGENCY PLAN

The Proteccion Tecnica Ecologica, Incorporated (PROTECO) hazardous waste contingency plan is designed to minimize hazards to human health and the environment from fires, explosions or any unplanned releases of hazardous waste into the air, soil or surface water. The plan maps out the general strategies for dealing with both sudden (acute) and non-sudden events. The strategies involve a series of steps to be taken in response to an actual emergency incident and includes decision points where outside assistance may be required and the circumstances under which the evacuation of the facility is advisable. The strategies also identify the equipment and materials that are to be used if an incident should occur.

The facility emergency coordinator is the person designated by the facility to be responsible for coordinating response and recovery activities at the facility during emergencies. The actions that will be taken by the coordinator following the discovery of an emergency are incorporated into the plan.

Although the contingency plan provides a plan of action to be taken during and after an emergency situation has occurred, training of personnel is necessary to ensure that the correct actions are taken before, during and after the emergency. The training of personnel includes procedures relevant to the positions in which individuals are employed so that they are able to respond to emergencies and are familiar with emergency procedures, emergency equipment and emergency systems. (For more information concerning training, please refer to Section H, Personnel Training.)

The hazardous waste contingency plan contains eight parts:

1. General Information: Provides pertinent information concerning Proteccion Tecnica Ecologica, Inc.

2. Emergency Coordinators: Includes the names, addresses and phone numbers of all personnel qualified to act as emergency coordinators during an incident at the facility.

3. Implementation of the Contingency Plan: Provides guidance to the emergency coordinator in making decisions on when to implement the contingency plan.

4. Emergency Response Procedures: Includes the actions to be taken when it becomes necessary to implement the contingency plan and the procedures for removing a surface impoundment from service.

5. Emergency Equipment: Includes lists of all emergency equipment located at the facility that can be used in the implementation of the contingency plan.

6. Coordination Agreements: Describes the emergency arrangements agreed to by the local police and fire departments.

7. Evacuation Plan: Describes evacuation of the facility should it be necessary to consider evacuation.

8. Required Reports: Lists the reports that must be completed after an incident requires the implementation of the contingency plan.

The information as contained herein is submitted in accordance with 40 CFR 270.14(b)(7), 270.14(c)(3)(vi) and 264 Subpart D and the Puerto Rico Environmental Quality Board (EQB), Part VIII, Rule 810 and 811 and Part IX, Rule 902(d).

G-1 General Information [40 CFR 270.17(f)]

PROTECO operates the 35-acre treatment storage and disposal facility located 7 KM southeast of the City of Penuelas, Puerto Rico. PROTECO's

EPA identification number is PRD091018622. The general manager and primary Emergency Coordinator (EC) of the facility is listed in Appendix G.1. He can be reached at (809) 836-2058 between 8 a.m. and 5 p.m. on weekdays. The facility chemist, also listed in Appendix G.1, is the alternate emergency coordinator and can also be reached at (809) 836-2058 between 8 a.m. and 5 p.m. on weekdays. A summary of the general information is provided in tabular form in Table G-1 for ease of use during an emergency situation.

The activities conducted at the PROTECO hazardous waste management facility include the treatment, storage and disposal of hazardous waste and the treatment and disposal of non-hazardous waste. The hazardous wastes received and accepted at the facility are generated from many diverse manufacturing and government operations located in the Commonwealth of Puerto Rico. The hazardous waste is transported from these generators to the facility primarily by the PROTECO transportation staff. The plant address is:

Proteccion Tecnica Ecologica, Inc.
Road 385-Km. 3.5
Tallaboa,
Penuelas, Puerto Rico
(809) 836-205

The mailing address is:

Proteccion Tecnica Ecologica, Inc.
Firm Delivery
Ponce, Puerto Rico 00731

Two methods are currently used to treat the hazardous wastes accepted for treatment, storage and disposal to render the wastes less hazardous, non-hazardous, stabilized and/or more amenable to disposal. The primary method used is stabilization/fixation. This treatment procedure renders a

TABLE G-1

GENERAL INFORMATION SUMMARY

Name of Facility:	Proteccion Tecnica Ecologica, Inc.
EPA I.D. Number.:	PRD091018622
Location:	Road 385 - Km 3.5 Tallaboa Penuelas, Puerto Rico
Mailing Address:	Firm Delivery Ponce, Puerto Rico 00731
Facility Telephone Number:	(809) 836-2058
Facility Owner:	Compania Ganadera del Sur, Inc.
President:	Jorge Fernandez
General Manager:	Raul Gaya
Type of Facility:	Hazardous waste treatment, storage and disposal facility
Facility Site Plan:	Figure G-1
Description of On-Site Activities:	Stabilization/Fixation Neutralization Storage of waste in containers Storage of waste in tanks Storage of wastes in surface impoundments Landfill

waste to a concrete-like solid material by reacting cement kiln dust, water and waste to form a solid. PROTECO also employs neutralization as a treatment process. Acidic and alkaline wastes are combined in this process resulting in a waste with an acceptable pH level (6.0 to 9.0).

Figure G-1 locates the proposed treatment, storage and disposal sites at the PROTECO facility. A new tank farm consisting of eight (8) aboveground treatment/storage tanks will be constructed to improve PROTECO storage and waste handling capabilities. A new Stabilization/Fixation Facility will include a pug mill, batch tanks and three silos containing lime, kiln dust and fly ash.

Table G-2 summarizes proposed disposal practices at PROTECO.

The facility accepts a broad range of hazardous wastes. Primarily, the wastes are received in liquid form. PROTECO also treats, stores and disposes of those wastes that are solid, sludges or slurries. Both characteristic and listed wastes as defined by 40 CFR 261 are accepted for treatment storage and disposal and include but are not limited to:

- ignitable wastes
- corrosive wastes
- EP toxic wastes
- halogenated solvents
- pesticide waste
- electroplating sludges

In addition to the proposed hazardous waste facilities described above, the PROTECO hazardous waste management facility also consists of non-hazardous waste treatment and disposal facilities. The present facility includes a land treatment/landfill area for the treatment and disposal of non-hazardous solid waste. The land treatment facility has received a permit to operate from the Environmental Quality Board.

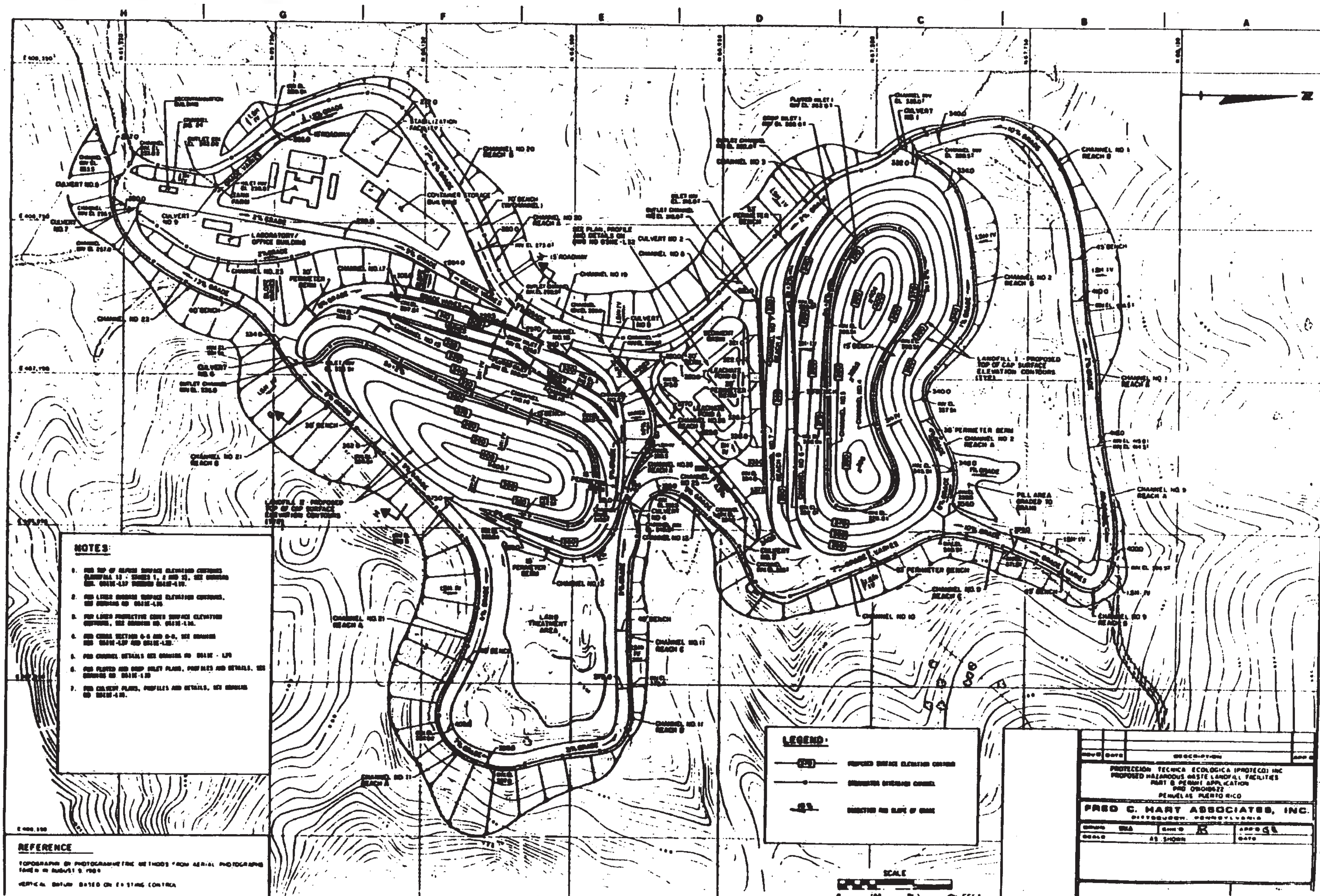


FIGURE G-1

PROPOSED PROTECO FACILITIES

TABLE G-2

SUMMARY OF PROPOSED DISPOSAL PRACTICES AT SCI

STORAGE FACILITIES

Container Storage Facility

Surface Impoundments

Tanks

T-1 Alkali Tank
T-2 Acid Tank
T-4 Halogenated Solvents Tank
T-5 Non-Halogenated Solvents Tank
T-6 Oil Sludge Tank
T-7 Aqueous Tank
T-8 Oils Tank

Treatment Facilities

Tank

T-3 Neutralization Tank

Stabilization/Fixation Unit

Disposal Facilities

Landfill I
Landfill II

G-2 Emergency Coordinators [40 CFR 264.52(d) and 264.55]

The PROTECO emergency coordinator is the person designated by the facility to be responsible for coordinating the response, control, cleanup and recovery activities at the facility during an emergency situation. He is responsible for the coordination of facility emergency personnel and for contacting outside emergency assistance. He decides how many personnel are needed, what equipment to use and what strategies to employ to achieve a safe, efficient and effective containment and cleanup. He keeps in contact with the facility general manager during an emergency situation to coordinate the need for additional outside help, replacement men and/or supplies. The coordinator is designated authority by PROTECO to commit the resources needed to carry out the contingency plan (money, manpower, equipment, etc.). This authorization is shown in Figure G-2.

The emergency coordinator and his alternates are expected to be thoroughly familiar with all aspects of the PROTECO contingency plan, the facility layout, the characteristics of the wastes that are handled by the facility, the treatment, storage and disposal operations, and the location of all records kept by the facility. The emergency coordinator and alternates receive specialized training to ensure that they are familiar with the above. The emergency coordinator's job responsibilities as defined in 40 CFR Section 265.55 and 264.56 are provided in Appendix G.2.

At all times, there is at least one emergency coordinator either on the facility premises, at the Penuelas office or on call (i.e., available to respond to an emergency by reaching the facility within a short period of time). Appendix G.1 lists the primary and alternate PROTECO emergency coordinators.

G-3 Implementation of the Contingency Plan [40 CFR 264.51]

The contingency plan will be implemented if an incident occurs at the facility that might threaten human health or the environment. The contingency plan includes responses to threats both internal and external to the facility. Emergencies that might arise could be caused by acute events or

FIGURE G-2

EMERGENCY COORDINATOR AUTHORIZATION FORM

This signed document will be included in the March 30, 1986 EPA Submittal.

by non-acute events. Non-acute emergencies are situations that can be readily controlled with on-site emergency equipment and by the emergency response personnel. This would include the discovery of a leaking drum or a small spill of hazardous waste. Acute emergencies are those incidents that are not readily controlled by emergency equipment and emergency response personnel. This would include the spill of an ignitable waste, a fire or an explosion.

In case of an emergency situation, the emergency coordinator has full authority to make the decision to implement the contingency plan.

As required by 40 CFR 264.196, the contingency plan is to be implemented if a leak and/or a spill from the proposed tank farm occurs. Procedures to respond to tank spills or leakage, removal of the waste and repair of the tank are provided in Section G-4. 40 CFR 264.227(d) also requires the contingency plan to be implemented whenever a surface impoundment must be removed from service. Procedures for responding to this situation are also provided in Section G-4.

G-4 Emergency Response Procedures [40 CFR 264.52(a), 264.56, 264.194(c) and 264.227(c)]

G-4a Notification

In the event of the discovery of an imminent or an actual emergency situation the employee or security guard discovering the situation must immediately contact the Emergency Coordinator (EC) or his alternate. Upon notification, the emergency coordinator will obtain as much of the following information as possible: brief description of the incident, exact location, time, accessibility, and hazardous waste(s) involved.

After assessing the situation, the emergency coordinator will provide instructions to operating personnel exposed to the danger and to the security guards so they can take the appropriate actions. Each work team at the facility will carry a walkie-talkie to allow communications with the observation point.

The facility also has an observation point, situated at a location which is sufficiently elevated to permit visual contact throughout the facility. The guard at the observation point will be equipped with binoculars. In the event of a sudden (acute) emergency, the emergency coordinator will call by radio-telephone the appropriate commonwealth or local agency. Outside agencies will be contacted immediately in the case of fire, the release of hazardous gas fumes, smoke or a release of hazardous waste is discovered that cannot be readily controlled with on-site equipment, materials or personnel, and when his assessment indicates that local areas might need to be evacuated. Table G-3 lists the outside emergency contacts that may be contacted during an emergency. Table G-4 lists additional equipment available from off-site facilities.

The Petrochemical Complex Mutural Aid Organization is located in the area of Tallaboa which includes: Commonwealth Oil Refining Co., Union Carbide Caribe, PR Electric Power Authority, Shell, Texaco, Industrial Chemical Corp. The same is prepared to deal with emergencies such as fires, spills and accidents in the area. All the equipment in this area is available for these types of emergencies.

If the facility has had a release, fire or explosion which could threaten human health or the environment, the emergency coordinator will notify the National Response Center at (800) 424-8802 and report the incident. The notification will include the following:

- name and telephone number of the reporter
- name and address of the facility
- date, time and type of incident (e.g., spill occurring at 3:30 pm)
- identification of the source of characteristics and quantity of materials involved (e.g., 50 gallons of electroplating waste, container storage area)
- the extent of injuries, if any
- an assessment of the possible hazards to the environment and human health outside the facility

TABLE G-3

OUTSIDE EMERGENCY ASSISTANCE

EMERGENCY CONTACTS

Contact	Location	Telephone
Civil Defense	Penuelas	(809) 724-0214
Police Department	Penuelas	(809) 343-2020
Fire Department	Penuelas	(809) 343-2330
Hospital de Damas	Ponce	(809) 843-5151
Penuelas Medical Center	Penuelas	(809) 836-1651
REGULATORY AGENCIES		
National Response Center	Washington, D.C.	(800) 424-8802
USEPA Region II	New Jersey	(201) 548-8730
Environmental Quality Board	San Juan	(809) 725-5140
USEPA - Puerto Rico Division	San Juan	(809) 724-7825
	CONTRACTORS	
Hays International	Penuelas	(809) 836-1290
Guayinilla Heavy Equipment	Penuelas	(809) 836-1112
Palaballaboa Heavy Equipment	Penuelas	(809) 840-3535
Lagares Sewage Service	Ponce	(809) 843-1475

TABLE G-3 (continued)
OUTSIDE EMERGENCY ASSISTANCE

EMERGENCY CONTACTS

Contact	Location	Telephone
C.H. Heist Caribe Corp.	State Highway #385 Tallaboa, Penuelas, Puerto Rico	(809) 836-1290 (809) 843-3040
Eduardo Fraticelli Trucking	State Highway #385 Tallaboa, Penuelas, Puerto Rico	(809) 836-1610 (809) 844-3589
Carbide Hydroblasting Corp.	State Highway #385 Tallaboa, Penuelas, Puerto Rico	(809) 836-1110 (809) 844-0410
Tallaboa Heavy Equipment	State Highway #385 Tallaboa, Penuelas, Puerto Rico	(809) 836-1439 (809) 836-1074
Ponce Waste Disposal, Inc.	State Highway #1 Ponce, Puerto Rico	(809) 840-3535
CORCO	State Highway #127 Tallaboa, Penuelas, Puerto Rico	(809) 836-1508
Lagares Sewer Service, Inc.	Fagot Avenue 0-18 Ponce, Puerto Rico	(809) 840-4410 (809) 843-1475
Indochem Services, Inc.	El Tuque Indust. Pk Ponce, Puerto Rico	(809) 843-6595

Petrochemical Complex Mutural Aid Organizations

Commonwealth Oil Refining Co.	(809) 843-3030
Union Carbide Caribe	(809) 840-2626
PR Electric Power Authority	(809) 844-6595
Shell Oil Co.	(809) 782-0560
Texaco Oil Co.	(809) 836-1260
Industrial Chemical Corp.	(809) 836-1230
ESSO	(809) 836-1150

TABLE G-4

ADDITIONAL EQUIPMENT AVAILABLE FROM OUTSIDE HELP

Vacuum Trucks

Two (2)	4,200 gals - Vacuum Trucks
Two (2)	2,300 gals - Vacuum Trucks
One (1)	3,000 gals - Vacuum Truck
One (1)	2,500 gals - Vacuum Truck

Tank Trucks

Four (4)	5,000 gals - Tank Trucks
Two (2)	8,000 gals - Tank Trucks
Two (2)	6,000 gals - Tank Trucks

Portable Pumps

Pumps	5, 10, 25, 50 gallons per minute; one each available

Dump Trucks

Four (4)	7 cubic yards capacity
Four (4)	24 cubic yards capacity
Two (2)	30 cubic yards capacity

Heavy Equipment

Three (3)	Loaders 3 cubic yard capacity
Two (2)	Backhoe 1 cubic yard capacity
One (1)	Crawler Tractors D-6
One (1)	Crawler Tractor D-7
One (1)	Crawler Tractor D-8
Two (2)	Wheel Tractor with Loader 1 cubic yard capacity
Two (2)	Motor scraper and hauling unit - 14 cubic yard capacity
Two (2)	Fork Lift
One (1)	All purpose excavator with telescopic full rotating boom capacity 1-3/4 cubic yards

Fire Fighting Equipment

Two (2)	Fire fighting trucks - water
Two (2)	Fire fighting trucks - foam
Two (2)	Dry chemical trucks

TABLE G-4 (Continued)

ADDITIONAL EQUIPMENT AVAILABLE FROM OUTSIDE HELP

Hoses - Approximately 2,000 ft.

4, 6, 8 inch diameter(s)

Absorbent Material

Booms, Pads, etc.

Fully Equipped Ambulances

Three (3)

Van With Safety Equipment

Two (2)

G-4b Identification and Assessment of the Emergency

During the initial phase of the emergency response, a number of key decisions must be made by the emergency coordinator regarding imminent or potential hazards and the need for the protective actions. The emergency coordinator will visually identify the characteristics, exact source, amount and areal extent of any released materials in a non-acute emergency. An acute emergency will be assessed visually (with binoculars if appropriate) by the emergency coordinator immediately after the situation has occurred. Safety is the primary concern, followed by the need to stop the flow of contaminants, to extinguish any fires, and eliminate sources of ignition or leakage. The emergency response team will move in (with proper protective equipment) after the situation is under control to further evaluate the character, severity and exact source of the released materials. All spills will initially be considered hazardous. The emergency coordinator will visually identify and note the source of the incident, physical properties, and the direction of the wind.

Releases of unknown composition will be considered hazardous until proven otherwise by analysis or specific knowledge of the material. If information cannot be obtained on the types of materials released by direct observation or review of facility records (including but not limited to waste manifest, waste characterization sheets, and material safety data sheets), a sample of each physically different (color, viscosity, physical state) material will be collected and analyzed for the parameters selected by the Laboratory Manager, based on the location in the facility where the release has occurred and documented data from surrounding regulated units.

Certain procedures and equipment have been classified by EPA as suitable for obtaining representative samples of hazardous waste. Sampling procedures will follow those in the PROTECO Waste Analysis Plan, Section C.

Before sampling any released hazardous waste, the PROTECO sampling personnel will typically wear the following personnel protective equipment:

- disposal, chemical-resistant coveralls
- chemical-resistant glove and boots
- safety glasses or goggles
- chemical-cartridge respirator

The following procedures will be used for sampling unknown hazardous waste spills:

1. Don protective equipment.

2. Approach spill material from upwind (where possible).

3. Obtain soil/waste sample with their or COLIWASA, label and place in a laboratory-cleaned sample bottle, and place sample on ice immediately after sample collection.

4. Use a different trier for each sample location and/or clean sampler between each sample point.

After the samples have been taken, they will be labeled and logged into the PROTECO laboratory log book.

The emergency coordinator will use Table G-5, Facility Design and Operation Release Potential, to assist him in determining potential hazards to human health or the environment.

G-4c <u>Emergency Response Procedures</u>

The EC is required to take a series of actions upon the discovery of an emergency situation, during the emergency control phase and immediately following the attainment of control. In order to develop an effective containment/cleanup strategy, the emergency coordinator must take the following information into consideration:

TABLE G-5

FACILITY DESIGN AND OPERATION RELEASE POTENTIAL

Release Source	Proposed Corrosive Storage Tank	Proposed Acid Storage Tank Tank (T_2)	Proposed Neutralization Storage Tank
Release Mode	Tank failure	Tank failure	Chemical reaction, tank failure
Design Size	15,000 gallons	30,000 gallons	10,000 gallons
Flow Rate	Variable	Variable	Variable
Secondary Containment	30,000 gallons	15,000 gallons	15,000 gallons
Waste Classification	Corrosive	Corrosive	Corrosive
Human Health Hazard	Dermal, oral	Dermal, oral, inhalation	Dermal, oral, inhalation
Environmental Hazard	High	High	Medium
Explosive			
Fire hazard			
Time Required to Empty tank with on-site equipment & off-site equipment	5 hours (2.5 hours)	10 hours (5 hours)	3 hours 20 min. (2 hours)
Major Equipment to use	Vacuum truck chemical	Vacuum truck, D-6, backhoe	Vacuum truck, D-6, backhoe, loader

TABLE G-5 (Continued)

FACILITY DESIGN AND OPERATION RELEASE POTENTIAL

Release Source	Stabilization/ Fixation Facility	Access Ramps Drum Storage Areas	Proposed Drum Storage Area
Release Mode	Batch Tank Failure	Drum Failure	Drum Failure
Explosion Fire			
Design Size	2,000 gallons	80-55 gallon drums 900 drums	8,640 sq. ft.
Flow Rate		Curbs	Cement Curb
Secondary Contain-men	Double Wall Tank	Drain to tanks	Curb
Waste Classifica-tion	Flammable Toxic Corrosive	Flammable Toxic Corrosive	Flammable Toxic Corrosive
Human Health Hazard	Dermal Inhalation Oral	Dermal Inhalation Oral	Dermal Inhalation Oral
Environmental Hazard	Toxic	Toxic	Toxic
Explosive Hazard	High	High	High
Fire Hazard	High	High	High
Time Required to empty with on-site equipment & off-site equipment	13+ hours when full	5 + hours when full	10 + when full
Major Equip-ment to use	manual pump/ tanker truck	Fork Lift Vacuum Truck Intrinsically safe pump, hose with ground wire.	Fork Lift Vacuum Truck Intrisically safe pump, hose with ground wire.

- physical state of spilled waste (solid, liquid, sludges, slurries)
- container characteristics
- spill situation (storage, treatment, transportation)
- potential fire or explosion hazards
- area that is affected
- environmental factors (e.g., weather conditions, wind direction)
- time of incident

The following subsections describe the initial response procedures that are taken by the facility during an emergency situation and the specific procedures that are use by emergency response personnel for the containment and cleanup of spills, fires or explosions.

G-4c(1) Initial Response Procedures. Initial response procedures to be taken by the facility personnel and the emergency coordinator are described below. These procedures are to be used for every emergency situation.

1. Any employee or security guard discovering or causing an emergency situation (spill, leaking drum) must immediately contact one of the emergency coordinators in the order described in Appendix G.1.

2. The employee or security guard will describe the emergency situation giving a brief description of the emergency, the exact location of the emergency, time of occurrence, accessibility to the emergency and the type and quantity of waste spilled, if possible.

3. By considering the nature of the emergency (i.e., leaking drum, spill or fire) the emergency coordinator will perform the following tasks:

   a. Assess the degree of hazard to operating personnel, emergency personnel and the surrounding area;

b. Notify all personnel on site of the emergency and stop all waste processing and disposal activities, in the emergency area or site wide when necessary;

c. Make and execute the decision to evacuate personnel from the affected area, when necessary;

d. If the released waste cannot be identified, collect and analyze a representative sample;

e. Make the decision to call outside organizations (Table G-4) and/or the National Response Center;

f. Will establish a staging area outside the danger zone where all personnel and equipment report in and receive their orders;

g. Select the appropriate personnel protective equipment; and

h. Formulate the response operation plan.

4. When the emergency coordinator makes a decision to evacuate the facility, the supervisors will be notified and the alarm system will be activated. Upon hearing the alarm, all employees must leave their work areas and evacuate the premises, as described under evacuation procedures (Section G-7).

5. The emergency coordinator will take all necessary measures to contain the hazard within the area of the facility and to prevent its spread to the environment and to the areas adjoining the facility boundaries.

6. Safety measures will be taken to ensure maximum protection of the safety and health of the emergency response personnel to include the use of appropriate personnel protective equipment. At a

minimum, this personnel protective equipment will include the following:

a. disposable, chemical-resistant coveralls
b. chemical resistant gloves and boot
c. safety glasses or goggles
d. chemical-cartridge respirator
e. hard hats

7. All non-emergency response personnel will be moved from the hazard area and any established buffer zone areas until the emergency has been taken care of.

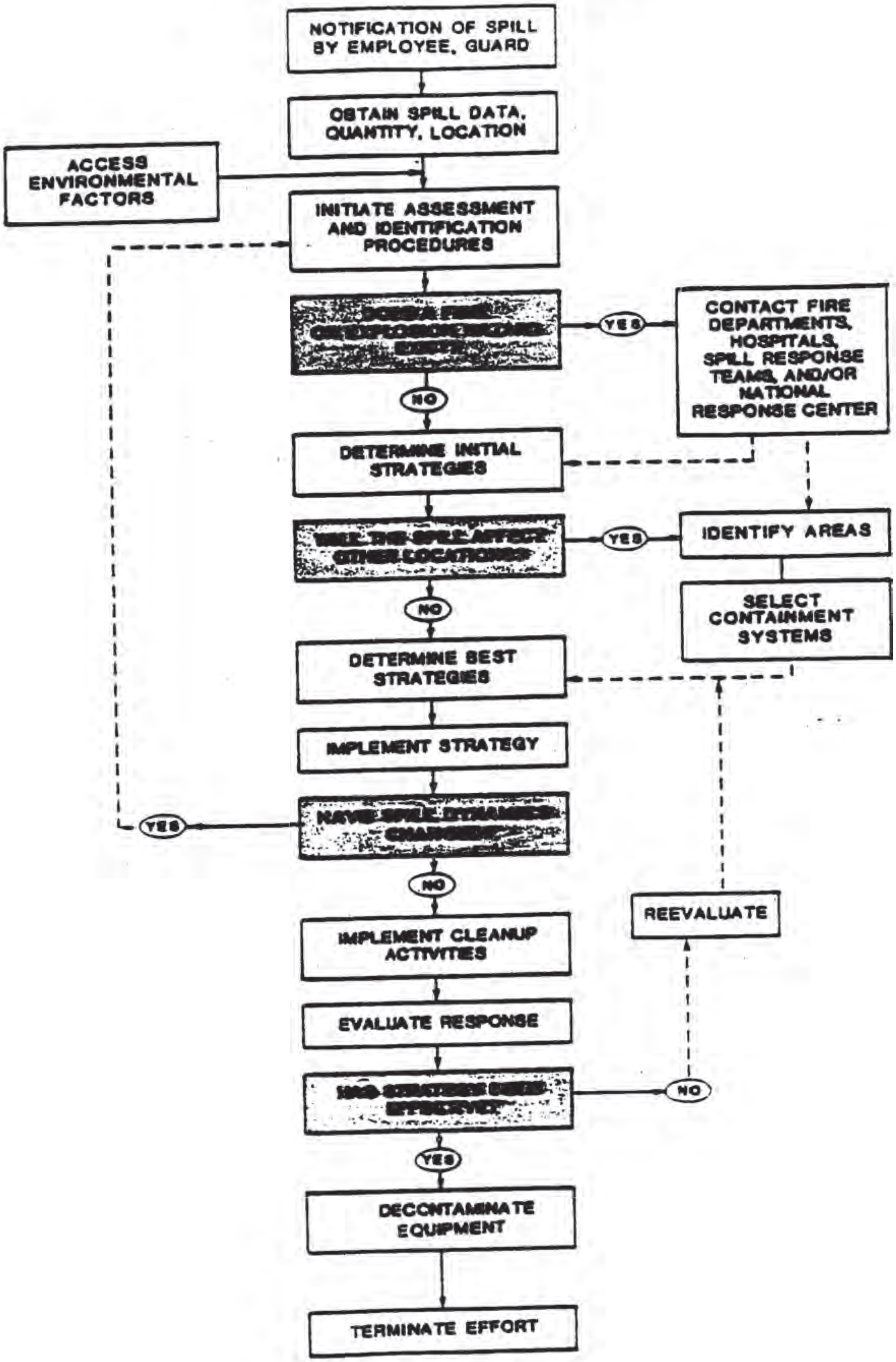
8. Upon the arrival of emergency response personnel and/or outside organizations the emergency coordinator will brief them regarding the potential or actual hazards, the location of the emergency, the containment procedures to be used and the appropriate personnel protective equipment.

G-4c(2) Spill Response Procedures. The goal of the spill response is containment and cleanup of the spilled material without hazard to human health or the environment. During a spill event, the emergency coordinator may instruct all employees and contractors to immediately stop all waste treatment operations (stabilization/fixation and neutralization) and to stop additions of waste to any area. This may include rejection of shipments of hazardous waste to the facility. This action will be taken so that all equipment materials and personnel can be focused on the emergency. Figure G-3 provides a flow chart to be used by the emergency coordinator during emergencies involving spills and the following pages list the procedures to be followed by the emergency response personnel.

G-4c(2)(a) Containment and Cleanup of Liquid or Slurry spills.

1. Berm ahead of the spill for containment of the liquid

FLOW CHART FOR SPILL RESPONSE



2. Stop flow of the liquid at source by one of the following methods:

   a. plug hole in drum or tank using putty
   b. turn off valve/drain if applicable
   c. upright overturned container
   d. place drum in an oversized drum

3. In the case of a small spill (under 50 gallons) place the appropriate absorbent material on the spill. (Table G-6 outlines the properties of the spill control materials used by PROTECO.)

4. In the case of a large spill (greater than 50 gallons), the emergency response personnel will build berms and trenches to direct the flow to depressed areas for easy collection. When liquids have entered small intermittent drainages, it may be possible to construct a dam to stop the downstream flow. Berms, trenches and dams can be constructed using hand tools or heavy equipment (D-6, backhoe, loader), with native soil and absorbent pads. When necessary, the liquid will be pumped into containers, tanks or impoundments. Then the appropriate absorbent material will be placed on the spill.

   Commercial sorbent materials for spill cleanup may be used as barriers to overland or water-borne flow as long as they do not become saturated. Rolls of sorbent should be deployed at the perimeter of a terrestrial spill. Sorbent sheets may also be placed around the leading edge of the spill. Table G-7 outlines the properties of the native soil at the site. This soil is good for construction of temporary dikes, berms and dams due to its high fines content, clay content and compaction properties.

5. If the released waste is an ignitable material, special precautions regarding flammability must be taken. No sparks, flames, arcs or heated items will be used in area.

TABLE G-6

SPILL CONTROL PROPERTIES OF ABSORBENT MATERIALS
USED AT PROTECO

Material	Usage	Bulk Density of Material (lbs/cubic ft.)	Gallon of Contaminant Attenuated Per Pound of Material (gallons)	Capacity for Absorption By Volume of Material (percent)	Bags of Material Required per 5 gal Spill
eedi-Dri	Absorption of non-chlorinated and chlorinated solvents, oils	30 - 40	0.11 - 0.13	50 - 60	1 1/2*
Vermiculite	Absorption of acid or alkaline waste spills, aqueous materials, oils	30 - 40	0.11 - 0.13	50 - 60	1 1/2*
Cement Kiln Dust	Absorption of EP Toxic solutions and sludges, waste lindance solution and other toxic materials	100	0.08 - 0.11	40 - 50	N/A

* Calculation assumes a 50 percent excess quantity of adsorbent material over the theoretical amount required to adsorb a 5 gallon spill.

TABLE G-7

SUMMARY OF SOILS LAB WORK

Boring No.	NI1	PI F-1	IF-2	IF2-A
Soils Description	Brownish white sandy silt	Brown to olive brown sandy silt come clay	Pale brown olive brown silty clay traces of fine sand	Pale brown, olive mottle, silty clay traces of pebbles and fine sand
rain size % passing No 200 leive	-	-	86.6%	-
Depth	0-6'	0-4'	2' @ 5'	2.5' @ 5'
oisture ontent	18%	20%	26.9%	

6. Shovels and/or a bulldozer will be used for cleaning up the contaminated absorbent material and soil. All contaminated and discolored soil will be scraped up within 12 inches of the spill surface soil.

7. All contaminated materials and soil will be placed in 55 gallon drums compatible with the contaminants and the drums will be marked with the appropriate DOT labels and markings.

8. All materials (contaminated absorbent, soil, disposable equipment and the water used to decontaminate the equipment) generated by the emergency response personnel will be treated and disposed of at the PROTECO facility.

9. All reusable equipment will be decontaminated.

10. The emergency coordinator will ensure that all emergency equipment is restored to full operational status by the emergency response personnel. Appendix G.3 provides a checklist to be completed by the emergency coordinator after each incident.

11. The emergency coordinator will investigate the cause of the emergency and will take steps to prevent the recurrence of such an incident.

12. The emergency coordinator will notify the EPA, EQB and local agencies where applicable.

13. If necessary, the emergency coordination will submit a written report of the incident to the Administrator of EPA Region 2.

G-4c(2)(b) Containment and Cleanup of Sludge and Solid Spills.

1. Stem the flow to prevent further spills by using plugs, patches, reinforcing the container or uprighting the container.

2. If it is extremely windy and the waste is dry and granular, cover the spilled waste with plastic sheeting to prevent dispersion. During clean up, the cover will be folded back to expose only the waste to be shoveled immediately.

3. Using a shovel to clean up the spilled waste and the contaminated soil, place into containers which have been determined to be compatible with the released material.

4. If the spill occurred due to a damaged container, enclose the container in an overpak or transfer the contents of the container to a new drum. Label and mark drum as required by DOT.

5. Decontaminate all reusable equipment and put disposable equipment into one of the spill cleanup containers.

6. Mark and label any containers used to hold spilled and contaminated materials according to applicable DOT regulations.

7. The emergency coordinator will ensure that all emergency equipment is restored to full operational status by the emergency response personnel. Appendix G.3 provides a checklist to be completed by the emergency coordinator after each incident.

8. The emergency coordinator will investigate the cause of the emergency and will take steps to prevent the recurrence of such an incident.

9. The emergency coordinator will notify the EPA, EQB and local agencies where applicable.

10. If necessary, the emergency coordinator will submit a written report of the incident to the Administrator of EPA Region II.

G-4c(3) Fire and/or Explosion Response Procedures. The following provides the procedures to be followed if a spill of a volatile ignitable waste, a fire and/or an explosion occurs.

1. The emergency coordinator will determine if a fire or explosion hazard exists or has occurred from the information provided during the notification

2. The emergency coordinator will notify the Penuelas Fire Department (343-2330) and the local civil defense department (724-0124). The facility can be accessed by the fire fighting vehicles and related equipment from these organizations.

3. If a fire should break out, emphasis will be placed on preventing the fire from spreading to nearby areas and to other sections of the facility where ignitable wastes are handled by providing trenches as fire barriers. When possible, ignitable waste will be moved away from the fire area. Reactive wastes are not treated/stored/disposed of at this facility.

4. All ignition sources must be eliminated within the emergency zone. These include open flame, hot objects, sources of static discharge, sparks from electrical equipment, and ferrous tools that can strike a spark. Radios, motors or pumps used within the zone must be explosion proof.

5. The emergency coordinator will take measures to ensure maximum protection for the safety and health of emergency response personnel, outside assistance areas surrounding the facility.

6. The emergency coordinator will have the emerging response personnel activate the facility fire fighting system.

7. After the ignitable vapors have been dispersed and the fire eliminated, shovels and/or bulldozers will be used to clean the

hazard area by scraping up contaminated soil. All waste generated from the containment and cleanup will be disposed of as hazardous waste.

8. Following containment and control of the emergency, the EC will provide for the collection, treatment and/or disposal of the wastes, contaminated soil, water or other materials generated from the cleanup of the emergency situation. All disposable equipment will be placed in one of the spill cleanup containers. These containers will be labeled and marked as required by DOT.

9. The emergency coordination will ensure decontamination of all reusable equipment.

10. The emergency coordinator will ensure that all emergency equipment is restored to full operational status by the emergency response personnel. Appendix G.3 provides a checklist to be completed by the emergency coordinator after each incident.

11. The emergency coordinator will investigate the cause of the emergency and will take steps to prevent the recurrence of such an incident.

12. If necessary, the emergency coordination will submit a written report of the incident to the Administrator of EPA Region II.

13. The emergency coordinator will notify the EPA, EQB and local agencies where applicable.

G-4c(4) <u>Leak or Spills from Tanks</u>. In the event of a leak or spill from the proposed tank facilities, all hoses, hatches and drains will be checked and closed if open. If the waste spill is not contained within the secondary containment area, an area of isolation will be established around the release. The separate Stormwater Holding Impoundments can also be used for containment if the waste is compatible with the liner. The size of the area will generally depend on the size of the spill and the waste involved. If the spill is large and involves a tank rupture, an initial isolation of at least 100 feet in all directions will be used. Small spills or leaks from the tanks or hose will require evacuation of at least 50 feet in all directions to allow cleanup and repair. When any spill occurs, only emergency response personnel will be allowed into the designated hazard area as directed by the emergency coordinator. As soon as possible, the area will be roped or otherwise blocked off. Containment and cleanup will use the procedures described in Sections G-4a and G-4b.

G-4c(5) Emergency Response for Surface Impoundments. The surface impoundment will be inspected weekly and after every storm to determine if a sudden drop of the level of liquids has occurred or if leaks have developed in the liner. If either of these situations are observed during an inspection, the inspector will immediately notify the emergency coordinator. The emergency coordinator will have the facility stop all additions to the surface impoundment and will authorize any surface leakage that has occurred or is occurring to be isolated. The size of the isolation area will depend on the size of the leak and the waste type involved. The isolation area will be contained by building dikes with absorbent pads and/or dirt. If possible, the flow will be directed to depressed areas in the diking system for easy collection.

For small spills the appropriate absorbent material (see Table G-5) will be added to absorb free liquid. For spills of 25 to 100 gallons, the liquid will be pumped into approved DOT containers. For spills of 100 to 2,000 gallons, the vacuum truck will be used to remove and store the liquids. All the waste and cleanup materials shall be considered hazardous waste and will be treated and disposed of by the facility.

If a leak cannot be stopped by any other means, the surface impoundment will be emptied using the on-site equipment 2,000-gallon vacuum truck and a 50 gpm at 30 psi pump and outside contractors. There are three surface impoundments which could be used for waste transfer. Referring to Table G-4, the total capacity of vacuum trucks and tanker trucks which can be called in to assist in this dewatering activity is 66,500 gallons.

G4c(6) Contingency for Treatment and Disposal of Released Material (264.56(g). In the event that existing treatment and disposal facilities are unavailable during emergency events. PROTECO will call in outside contractors. Those contractors will supply pumps (to convey spilled material into the trucks), cement kiln dust, dust transfer equipment and heavy construction equipment for use in building an emergency storage facility.

G-4d Prevention of Recurrence

Within 48 hours of the deactivation of the Contingency Plan (following an event requiring its activation), the facility's Director of Operations and Lab Manager will meet with the responding Emergency Coordinator to review the circumstances surrounding the event necessitating Contingency Plan activation. Reviewed will be:

- factors leading up to the event
- response to the event
- ways to prevent a recurrence

If changes in facility operations procedures, construction procedures or redesign of facilities are necessary, such changes will be implemented by the Director of Operations as as soon as reasonably possible.

G-4e Incompatible Waste [40 CFR 264.56(h)(1)]

PROTECO does not normally place hazardous waste received at the facility or generated from spills in an unwashed container. In this way, PROTECO prevents reactions from occurring between incompatible wastes and containers previously holding a different hazardous waste.

The emergency coordinator will refer to Table G-8 to confirm that the material and containers are compatible. Additional information can be obtained from Section G-4c(2), Spill Response Procedures.

TABLE G-8

COMPATIBILITY CHART: CHEMICALS VERSUS CONSTRUCTION AND LINING MATERIALS

Construction Material	Chemicals Incompatible With
Steel	Mineral Acids: nitric, hydrochloric, sulfuric acids
Aluminum	Alkalies: potassium hydroxide, sodium hydroxide, mineral acids
Magnesium	Mineral acids
Lead	Acetic acid, nitric acid
Copper	Nitric acid, ammonia
Nickel	Nitric acid, ammonia
Zinc	Hydrochloric acid, nitric acid
Tin	Organic acids, alkalies
Titanium	Sulfuric acid, hydrochloric acid
Lining Materials	**Chemicals Incompatible With**
Alkyds	Strong mineral acids, strong alkalies, alcohols, ketones, esters, aromatic hydrocarbons
Vinyls (polyvinyl)	Ketones, esters, aromatic hydrocarbons chloride-PVC)
Chlorinated Rubbers	Organic solvents
Epoxy: (amine-cured, polyamide cured, or esters)	Oxidizing acids (nitric acid), ketones
Coal Tar Epoxy	Strong organic solvents
Latex	Oxidizing acids, ketones, esters
Polyesters	Oxidizing acids, strong alkalies, mineral acids, ketones, aromatic hydrocarbons
Silicones	Strong mineral acids, strong alkalies, alcohols, ketones, aromatic hydrocarbons

G-4f <u>Post-Emergency Equipment Maintenance [40 CFR 264.56(h)(2)]</u>

Reusable equipment emergency will be cleaned and inspected. All activities in this area will be noted on the Emergency Equipment Checklist, which will be kept a part of this plan. It will be the responsibility of the emergency coordinator to see that all non-functioning equipment is repaired and that critical equipment is replaced immediately with new or rental equipment.

The emergency coordinator will be responsible for ensuring that all necessary emergency equipment is clean and fit for use before operations are resumed within unaffected areas of the site. An emergency equipment checklist has been included as a part of this plan.

Equipment which malfunctions during the emergency will be repaired by a qualified technician or will be sent back to the supplier/factory for repair and/or replacement. Heavy equipment will be washed down with high pressure water and/or steam cleaned. The cleaning liquids will be collected and stored for treatment/disposal in the stabilization/fixation facility. All mechanical equipment will also undergo a systems check performed by a certified mechanic. Empty fire extinguishers and air packs will be sent back to the supplier for refilling and retesting/certification. Non-reuseable equipment, such as adsorbents, will be replaced.

G-4g <u>Container Spills and Leakage [40 CFR 264.52, 264.171]</u>

Action will be taken immediately after an assessment has been made as to the health and safety of employees, to contain, remove, store/treat/dispose of spilled material. Generally, the type of the spilled waste will be known and the time to don safety equipment and start the clean-up will be short.

Procedures for responding to spills and leakage may be found under Section G-4c(2), Spill Response Procedures.

The following are additional guidelines to be followed when responding to container spills and leakage:

Rotate The Container. For simple non-pressurized containers such as drums, the simplest way to stop flow from a leak is to turn the container so the leak is at the topmost point of the container.

Attempt To Decrease The Pressure. Decreasing pressure on many containers can substantially reduce the rate of flow from a leak. For a non-pressurized container, the goal is to restrict entry of outside air into the leaking container.

G-4h Tank Spills and Leakage [40 CFR 264.194(c)]

During a tank spill event, initial efforts should be made to stop the flow of waste causing the leak. If liquid is overflowing in a tank, waste feeds should be shut off (if the automatic system has not already done so). In the event of a piping leak, the pump feeding the pipe should be shut off and valving closed to isolate the piping section leaking.

If a tank is leaking from a seam, no action is necessary until it can be safely determined that a surface impoundment or other tank can safely receive the tank's contents. (Under normal circumstances, the contents of a leaking tank will be fully contained within the concrete secondary containment area.) It should also be noted that pumping systems for some tanks (solvents and oils) also contain provisions for transfer of tank contents to tank trucks; this is another option during emergency events.

In the event of a spill from a truck unloading wastes, the truck unloading areas have sumps and piped gravity drainage connections to the stormwater holding impoundment adjacent to the Tank Farm. This impoundment is also designed for use in the event that contaminated stormwater must be moved from a secondary containment area to maintain facility operations. (**Note:** small spills from unloading operations will be retained within the sump and will not overflow to the impoundment. These may be removed by pump and fed into the storage/treatment tanks, by waste class.)

Spills of ignitibles require special care in applying response procedures. The following guidelines apply:

- any spark or other source of ignition could turn a spill event into an explosion or fire. Responses must be carefully thought out (including activation/deactivation of electrical systems).

- Pumps, pipes, containers and tank trucks used for ignitable waste transfer must be grounded, and grounded in the proper order.

- Foam in containment areas carries the danger that ignitibles may be building up in concentration under the foam (and above sprayed water), without being visually noticed.

Thus, ignitable waste spill cleanup should be approached cautiously, using methods which will not results in introducing sources of ignition.

Additional procedures for containment and cleanup of tank spills and leakage may be found under Section G-4c(2)(a).

G-4i <u>Impoundment Emergency Repairs [40 CFR 264.227]</u>

In the event of a sudden drop in the level of liquids in any impoundment the following procedures will be followed:

- the emergency coordinator will be notified

- the emergency coordinator will call over the walkie-talkie and instruct an employee to stop waste addition or to tell the contractor to stop the waste addition

- the employee will call back to confirm that the waste addition has been stopped.

Analysis will then be made by the EC to determine whether any additional measures are necessary. No additional waste will be added until it is assured that liner integrity has been restored.

G-4j Preventing Catastrophic Failures

Inspection procedures to help prevent catastrophic failures can be found in the Part B Permit Application, Section F. This includes inspection requirements for the safety and emergency equipment, security, Container Storage Facility, Tank Farm Stabilization/Fixation Facility, Surface Impoundments and Landfills. All facilities have been designed to appropriate federal, commonwealth and building code standards, which should prevent catastrophic failures from occurring.

In the event one of the facilities used to store liquids fail, their contents will removed and placed in the surface impoundments and/or one of the storage tanks. The vacuum truck or chemical pump will be used to transfer the material along with outside equipment as needed (Table G-4).

G-4k Emptying the Impoundments

A list of the equipment to be used to empty impoundments can be found on Table G-9. The liquids will be: 1) transferred to another impoundment or tank; 2) sucked up into the vacuum truck and transported to the stabilization/fixation facility; or 3) pumped into contracted tanker trucks for storage prior to treatment/ disposal in the Tank Farm Stabilization/Fixation Facility.

Sludge in the bottom of the impoundment will be processed in the Stabilization/Fixation Facility.

TABLE G-9

EMERGENCY EQUIPMENT FOR SPILL CONTAINMENT AND CLEANUP

Material/Equipment	Location	Use	Notes
Vermiculite	Container Storage Facility	For small spills of oil, acids or caustics, aqueous materials	
Speedi-dry	Container Storage Facility	For small spills of oil, chlorinated/non-chlorinated solvents, aqueous materials	Keep in 55-gallon 17-E containers stored outside.
Cement kiln dust	In proposed silos. Stabilization/Fixation Facility	For spills of sludges, solids, toxic materials, lindane waste	
Soda ash	Container Storage	For spills of waste acid solutions	
Caliche	Borrow areas	To build dikes and for preventing run-off controls	
Absorbent pads	Container Storage Facility	Most organics. Do not use for acids.	

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TABLE G-9 (CONTINUED)

EMERGENCY EQUIPMENT FOR SPILL CONTAINMENT AND CLEANUP

Material/Equipment	Location	Absorbed/Cleaned up
55-Gallon drums; Steel, polyethylene	Container Storage area 4, 7, 11	Organics, contaminated absorbent materials (steel); acids, caustics, contaminated absorbent materials (polyethylene)
Shovels,	Main Facility	Excavation, spill cleanup
Pump (175 psi, 00 pm)	Stabilization/Fixation Facility	Excavation, spill
Vacuum truck	Maintenance Facility	Spill cleanup
Pickup trucks	Laboratory Facility	Spill cleanup
Front-end loader	Area 16, 17 Stabilization/Fixation Facility	Excavation, spill cleanup, building emergency dikes
Dump trucks	Stabilization/Fixation Facility	Debris removal, material delivery.

TABLE G-9 (CONTINUED)

EMERGENCY EQUIPMENT FOR SPILL CONTAINMENT AND CLEANUP

Material/Equipment	Location #	Absorbed/Cleaned up
Backhoe	Maintenance Facility	Dig trenches, berms, dikes and cleanup of spilled material
D-6	Shop area parking lot Landfill Facilities	Dig trenches, berms and dikes compact soil.
1-1/2 inch hose	Maintenance Facility	
Two gallon buckets with handles	Maintenance Facility	For spills of sludges, oils, and adsorbent
Five gallon buckets with handles	Maintenance Facility	For spills of sludges, oils, and adsorbent
Sheets of Plywood [illegible]/8" quartered (2'x 4')	Maintenance Facility	To build dams in culverts, berms
Visqueen	Maintenance Facility	To build dams, keep waste from being adsorbed by the ground
Reinforced Plastic Bags	Container Storage Facility	Temporary storage of soil, absorbents contaminated materials

G-41 Certification and Repairs as a Result of Sudden Drop [40 CFR 264.227 (d)(2), 40 CFR 264.227(d)]

G-4m Double-Lined Landfills or Surface Impoundments [263.222(b)]

The following are procedures to be taken in the event of a liquid leak into the leak detection system in the Landfills or Surface Impoundments:

- The employee will notify the emergency coordinator of the event and the depth of the liquid in the detection manhole.

- The emergency coordinator will instruct his employees to stop all waste additions into the landfills or Surface Impoundments.

- The emergency coordinator will instruct his employees to take a sample which will be sent to the on-site laboratory for analysis.

- The emergency coordinator shall send a report to the EPA Regional Administrator within seven days of the leak occurrence.

- The emergency coordinator will confer with an engineer and/or the material supplier to determine the best method to fix the problem. One solution would be to remove the waste, locate the leak, remove the liner material and install a patch. As part of this review a determination will be made as to the integrity of the secondary liner. A letter of certification will be obtained from a qualified engineer stating that the leak(s) had been repaired or the matter will otherwise be resolved with regulatory agencies before waste input to the unit is restarted.

G-5 Emergency Equipment [40 CFR 264.32 and 264.52(e)]

The following sections describe the available equipment that can be used in an emergency and the proposed schedule for purchasing of additional emergency equipment. Table G-10 provides the proposed schedule for obtaining this additional equipment.

G-5a Internal Communications

Existing Internal Communications. All PROTECO vehicles that enter the facility are provided with radiotelephone communication systems so that personnel can contact the office and hence the emergency coordinator in case of an emergency situation. Security guards are provided with walkie-talkies to facilitate internal communications during an emergency. The telephone numbers of the primary and alternate emergency coordinators and emergency numbers for outside assistance are located in the guard shack and at the receptionist desk in the office and at the new laboratory facility on-site.

In addition to the existing emergency warning system the proposed new facilities will incorporate self-contained compressed-gas-powered horns at fixed stations at the proposed facilities. These horns are non-electrical and contain enough bottled gas to sustain a 20 to 30 minute warning.

G-5b External Communications

PROTECO is equipped with the following equipment to provide external communications availability and access at the facilities:

- a radio system installed in all facility trucks which provide communication from the active portions of the facility to the laboratory and office

- walkie-talkies for security guards and each working group

PROPOSED SCHEDULE
Emergency Equipment

Item	Quantity	Date
Vermiculite	10 50-lb bags	March, 1986
Speedi-Dry	10 50-lb bags	March 1986
Caliche	10 50-lb bags	Purchased
Two Gallon Bucket with Handles	5	Purchased
Five Gallon Bucket with Handles	5	March 1986
Sheets of Plywood 5/8" quartered (2' x 4')	4	March 1986
Reinforced Visqueen	2 rolls	May 1986
Reinforced Plastic Bags	50	May 1986
Scott Air Packs	2	Purchased
Air tanks (for above)	2 2	Purchased
Hard Hats	24	Purchased
Shoulder Length Gloves	3 pair	Purchased
Hand-held Air Horn	10	Purchased
Eye Wash Station	6	As new facilities are constructed
Decontamination Showers	6	As new facilities are constructed
Decontamination Showers	3	As new facilities are constructed

- a telephone located at the office which may be used to summon assistance from local police and emergency teams.

The telephone system can call anywhere on the island. The walkie-talkies have a 60 mile range.

G-5c <u>Emergency Equipment</u>

A list of available emergency equipment for the containment and clean-up of spilled hazardous waste is provided in Table G-9. As indicated, absorbent materials will be stored in a number of areas, while earth-moving vehicles are located in either landfill areas. The standard absorbents are strategically located throughout the facility to facilitate rapid response effort. Procedures to be taken to ensure decontamination of this equipment and a checklist used by the emergency coordinator to determine equipment functionability is provided in Appendix G.4. In addition, all spill control, safety and fire control equipment is inspected monthly and a log of the inspection is kept for three years.

G-5d <u>Additional Water Supply</u>

New facilities include a water main and a 500,000 gallon firewater storage tank.

G-5e <u>Safety Equipment</u>

Protective clothing and equipment is utilized to protect employees during normal and emergency operations. Safety glasses and steel-toed boots or shoes constitute the minimum clothing requirements. The laboratory or Observation Post will be the predominant storage locations for the protective equipment, which includes the following:

- Scott air packs
- disposable chemical-resistant coveralls
- rubber/Neoprene boots
- rubber/Neoprene gloves

- chemical cartridge respirators
- full face masks
- non-toxic particle mask

First aid kits will be kept at the laboratory and in all waste transportation equipment (i.e., dump trucks, tankers, flatbed). In addition, PROTECO will also keep a Medical First Aid Chest in the laboratory. Emergency eyewash stations are located in all new facilities and Observation Post. Decontamination showers will also be located at the new facilities; Tank Farm, Container Storage Facility and the Stabilization/Fixation Facility.

G-6 Coordination Agreements [40 CFR 264.53]

PROTECO will make arrangements to familiarize the agencies listed below with the original facility contingency plan, facility layout, access roads, hazardous characteristics of wastes handled, and evacuation routes by holding a meeting with these agencies:

Municipal Government of Puerto Rico
Office of Civil Defense
P.O. Box 38
Penuelas, Puerto Rico

Department of Health
Penuelas Medical Center
Penuelas, Puerto Rico

Department of Fire
Penuelas, Puerto Rico

Department of Police
Penuelas, Puerto Rico

A copy of the original contingency plan will be maintained at the laboratory office on site. A copy of the new contingency plan as provided herein and all subsequent revisions is and will be maintained at the facility and submitted to all of the agencies listed above. Table G-12 provides the proposed schedule for obtaining local review of this revised Contingency Plan.

G-7 Evacuation Plan [40 CFR 264.52(f)]

In the event that a hazardous waste incident would present an imminent threat to personnel health, life or safety, the emergency coordinator will initiate the following evacuation procedures, by contacting the facility personnel and/or security guards on the radio-telephone and/or walkie-talkie. Only the emergency coordinator can initiate facility evacuation. Evacuation routes are shown in Figure G-4.

1. The emergency coordinator has assessed the situation and deems it necessary to evacuate the facility. He will contact the facility personnel and/or security guards on the radio-telephone, and walkie-talkie.

2. The security guards will proceed to the facility access gates. No further entry of personnel, visitors, contractors or trucks will be permitted.

3. Supervisors will designate the safest evacuation access routes for his employees to take and will also choose an alternate route in case the first choice is inaccessible or down wind of the emergency. The primary evacuation point from the site will be through the main gate at the south end of the facility. The secondary evacuation point will be on the north west section. Employees exiting here will proceed in a northwest direction up the drainage bed.

PROPOSED SCHEDULE
Coordination Agreements

Item	Date
Send out copies of contingency plan to various agencies	February 28, 1986
Review agencies comments	May, 1986
Make any necessary corrections	June, 1986
Hold meeting	June, 1986
Conduct additional conversation on plan	July, 1986
Sent letters outlining responsibilities	February 28, 1986

4. The supervisors will use the horns to sound the emergency signal. The signal will be two short blasts and one long blast. This signal will be repeated five times.

5. All personnel, visitors and contractors will exit through the access gate or secondary escape point. All employees will be accounted for by their supervisors who will report in to the emergency coordinator. The emergency coordinator will check the log book to account for all personnel visitors.

6. No personnel shall remain or re-enter the facility unless specifically authorized. Those allowed to enter the facility will normally include emergency coordinator, emergency response personnel and any outside assistance groups contacted.

7. Re-entry into the affected area will occur only after proper clearance is given. Situations which would warrant partial or complete evacuation of the facility would include:

   - spills or chemical reactions resulting in highly toxic fumes;
   - fire, when it cannot be contained and is spreading to other parts of the facility;
   - fire that could generate highly toxic fume, or an explosion.

Evacuation drills will be held bi-annually to practice the implementation of all the above procedures and are to be treated with the same seriousness as an actual emergency. If new roads are built, these routes will be revised.

The emergency coordinator will revise the evacuation procedures when the drills or actual implementation show that new procedures are needed.

G-8 Required Reports [40 CFR 264.56(i) and (j)]

The PROTECO facility manager must notify the EPA Region II Administrator, the Puerto Rico Environmental Quality Board and local authorities that the facility is in compliance with Section 265.56(h) of the Federal Regulations before operations at the facility are resumed in the areas affected by the emergency.

Within 15 days after an incident requiring implementation of the contingency plan, the facility manager or emergency coordinator shall submit a written report on the incident to the EPA Region II Administrator and the Puerto Rican Environmental Quality Board. A copy of the report will be kept as part of the contingency plan. A copy of the report form is provided in Figure G-5. The report includes the following information:

1. Name, address and telephone number of the owner or operator.

2. Name, address and telephone number of the facility.

3. Date, time and type of incident.

4. Name and quantity of materials involved.

5. The extent of injuries, if any.

6. An assessment of actual or potential hazards to human health or the environment where this is applicable.

7. Estimated quantity and disposition of recovered material that resulted from the incident.

The emergency coordinator will also note in the operating record the time, date and details of any incident that requires implementation of the contingency plan.

FIGURE G-5

REPORTING FORM FOR EMERGENCY EVENTS

Name of Facility: ______________________________

Address of Facility: ______________________________

____

____

Telephone Number: ______________________________

Name and Address of Operator:

____

(Name)

____

(Street)

____

(City) (State) (Zip Code)

Date: ____________________ Time: ____________________

Type of Incident: ______________________________

Name and Quantity of Materials Involved: ____________________

____

____

Extent of Injuries: ______________________________

____

____

Assessment of Hazards: ______________________________

____

Estimated Quantity and Disposition of Material from the Incident:

____

____

(0570B-10)

G-9 Amendments [40 CFR 264.540]

G-9a Amendments to the Contingency Plan

The contingency plan will be reviewed and revised by the PROTECO emergency coordinators whenever:

- the facility Part B permit is revised
- in accordance with the experience acquired during each emergency situation
- the plan fails during an emergency situation
- the list of emergency coordinator changes
- the list of emergency equipment changes
- changes in design, construction or operation increases the potential for released, fires or explosions.

G-9b Amendments to the Spill Prevention, Control and Countermeasures Plan (SPCC)

This contingency plan has been prepared in accordance with 40 CFR 264 Subpart D and with Part B of the permit application as required by the Environmental Protection Agency (40 CFR 122). This plan supplements PROTECO's SPCC plan developed in accordance with 40 CFR 112.

APPENDIX G.1

EMERGENCY COORDINATORS (EC) FOR PROTECO

Name	Title	Office Phone	Address	Home Phone
Raul Gaya Nigaglioni	Primary Emergency Coordinator	836-2058	103 Mallorca Floral Park Hata Rey, PR	754-7772
Victor Negron Vazquez	Alternate Emergency Coordinator	836-2058	Urb. Sta. Teresita Calle 4AX-18 Ponce, PR	840-2944
Juan Negron Rodriquez	Alternate Emergency Coordinator	836-2058	Quimico Bo Callores Carr 512 Juana Diaz, PR	836-1678
Francisco Bartolomei Leon	Alternate Emergency Coordinator	836-2058	Calle Central #23 Coto Laurel, PR	848-2176
Hector I. Zayas Ortiz	Alternate Emergency Coordinator	836-2058	Urb El Madrigal Calle 14 O-11 Ponce, PR	844-3401

APPENDIX G-2

RESPONSIBILITIES OF THE EMERGENCY COORDINATOR

EMERGENCY COORDINATOR RESPONSIBILITIES

AS DEFINED IN 40 CFR, PART 264, SUBPART D

40 CFR, 264.55 Emergency coordinator.

At all times, there must be at least one employee either on the facility premises or on call (i.e., available to respond to an emergency by reaching the facility within a short period of time) with the responsibility for coordinating all emergency response measures. This emergency coordinator must be thoroughly familiar with all aspects of the facilitiy's contingency plan, all operations and activities at the facility, the location and characteristics of waste handled, the location of all records within the facility, and the facility layout. In addition, this person must have the authority to commit the resources needed to carry out the contingency plan.

(Comment: The emergency coordinator's responsibilities are more fully spelled out in Section 265.56. Applicable responsibilities for the emergency coordinator vary, depending on factors such as type and variety of waste(s) handled by the facility, and type and complexity of the facility.)

40 CFR, 265.46 Emergency procedures.

(a) Whenever there is an imminent or actual emergency situation, the emergency coordinator (or his designee when the emergency coordinator is on call) must immediately:

(1) Activate internal facility alarms or communication systems, where applicable, to notify all facility personnel; and

(2) Notify appropriate State or local agencies with designated response roles if their help is needed.

(b) Whenever there is a release, fire, or explosion, the emergency coordinator must immediately identify the character, exact source, amount, and a real extent of any released materials. he may do this by observation or review of facility records or manifests and, if necessary, by chemical analysis.

(c) Concurrently, the emergency coordinator must assess possible hazards to human health or the environment that may result from the release, fire, or explosion. This assessment must consider both direct and indirect effects of the release, fire, or explosion (e.g., the effects of any toxic irritating or asphyxiating gases that are generated, or the effects of any hazardous surface water run-offs from water or chemical agents used to control fire and heat-included explosions).

(d) If the emergency coordinator determines that the facility has had a release, fire, or explosion which could threaten human health, or the environment, outside the facility, he must report his findings as follows:

(1) If his assessment indicates that evacuation of local areas may be advisable, he must immediately notify appropriate local authorities. He must be available to help appropriate officials decide whether local areas should be evacuated; and

(2) He must immediately notify either the government official designated as the on-scene coordinator for that geographical area (in the applicable regional contingency plan under Part 1510 of this Title), or the National Response Center (using their 24-hour toll free number 800/424-8802). The report must include:

(i) Name and telephone number of reporter;

(ii) Name and address of facility;

(iii) Time and type of incident (e.g., release, fire);

(iv) Name and quantity of material(s) involved, to the extent known;

(v) The extent of injuries, if any; and

(vi) The possible hazards to human health, or the environment, outside the facility.

(e) During an emergency, the emergency coordinator must take all reasonable measures necessary to ensure that fires, explosions, and releases do not occur, recur, or spread to other hazardous waste at the facility. These measures must include, where applicable, stopping processes and operations, collecting and containing released waste, and removing or isolating containers.

(f) If the facility stops operations in response to a fire, explosion or release, the emergency coordinator mut monitor for leaks, pressure buildups, gas generation, or ruptures in valves, pipes, or other equipment, wherever this is appropriate.

(g) Immediately after an emergency, the emergency coordinator must provide for treating, storing, or disposing of recovered waste, contaminated soil or surface water, or any other material that results from a release, fire, explosion at the facility.

(Comment: Unless the owner or operator can demonstrate, in accordance with Section 261.3(c) or (d) of this Chapter, that the recovered material is not a hazardous waste, the owner or operator becomes a generator of hazardous waste and must manage it in accordance with all applicable requirements of Parts 262, 263, and 265 of this Chapter.)

(h) The emergency coordinator must ensure that in the affected area(s) of the facility:

(1) No waste that may be incompatible with the released material is treated, stored, or disposed of until cleanup procedures are completed; and

(2) All emergency equipment listed in the contingency plan is cleaned and fit for its intended use before operations are resumed.

APPENDIX G.3

PROTECO
EMERGENCY EQUIPMENT CHECKLIST

Per 40 CFR, Part 264.56(h)(2) the following emergency equipment must be cleaned and fit for its intended use before operation of the facility is resumed.

Item	No.	Functional	Non-Functional	Corrected (initial/date)
quipment				
sorbent pads				
Fire Extinguishers				
ott Air Packs				
Shovels				
se				
mps				
Backhoe				
ont-end Loader				
D-6				
cuum truck				
dio-telephone				
Walkie-talkies				

SECTION H - PERSONNEL TRAINING PLAN

SECTION H

PERSONNEL TRAINING

The information contained in this section outlines the existing PROTECO personnel training program. This information is submitted in accordance with the requirements of 40 CFR 270.14(b) (12) and 264.16 and the Puerto Rico Environmental Quality Board, Part VIII, Rule 808.

H-1 Description of the Existing Personnel Training Program [40 CFR 122.25(a)(12)]

This program was developed to ensure that facility personnel are properly trained in hazardous waste management. It is the general manager's responsibility to have the training programs conducted and to provide for adequate documentation of personnel trained by these training programs. The employee training program consists of the following parts:

- an initial hazardous waste management orientation, which includes a review of the PROTECO Training Manual. (Appendix H.1)
- a required reading file
- specific on-the-job training
- an annual review
- seminars and classroom training

H-1a Initial Orientation

The purpose of the hazardous waste management orientation is to train personnel involved with the storage, treatment, or disposal of hazardous waste or the maintenance of hazardous waste equipment and systems. This training program is designed to be a general introduction to hazardous waste management.

The program is conducted for any new employee within the first six months of employment. This orientation includes the following:

- defining hazardous waste, generator, transporter and treatment, storage and disposal facility
- requirements for generators
- familiarization with emergency procedures/implementation plans
- familiarization with emergency equipment and monitoring equipment

A copy of the hazardous waste orientation meeting outline is provided in Appendix H.2. Attendance of the meeting by facility personnel is documented on a log. A copy of this log is kept as part of the employee files and will be maintained for the life of the facility, or for three years after the termination of employment, whichever comes first.

H-1b <u>Reading File</u>

The purpose of the reading file is to maintain a file of required training material to be read by all management personnel (general manager, lab manager, operations managers, and supervisors) whose operations are defined to include generating, storage, treatment, or disposal of hazardous waste or whose operations include maintaining hazardous waste equipment and systems. The reading file conveys information on hazardous waste management practices.

Documents in the reading file include any required plans such as emergency plans, contingency plans, closure plans, and waste analysis plans. Additional documents may include standard operating procedures, specifications, manuals, pamphlets, etc., that establish or explain hazardous waste management procedures that are or can be followed at the facility.

H-1c On-the-Job Training

All employees directly involved with the handling or transportation of hazardous waste also receive on-the-job training to augment the hazardous waste management orientation and to provide additional competence in the handling or transportation of hazardous waste. This training is conducted under the direction of the general manager. On-the-job training provides the employees with the time to become acquainted with the facility operations. The immediate supervisor instructs all new employees prior to starting any new job function. He instructs them in proper job operations and how to work the facility equipment. Should there be any question about the prescribed safe method of operation, the immediate supervisor is consulted for clarification.

H-1d Annual Reviews

An annual review was conducted for all personnel employed by the facility in 1982. PROTECO will continue to hold annual reviews for the facility personnel as described further on in this section.

H-1e Seminars

Seminars involving classroom training are conducted by facility management personnel. These seminars are attended by all or specific groups of employees, depending on the seminars subject area. Seminar subject areas include:

- Contingency Planning and Emergency Response
- Facility Operations
- Waste Analysis and Monitoring
- Waste Transportation
- Handling of Hazardous Wastes

H-2 Job Titles and Duties [40 CFR 264.16(d)(1),(2)]

Figure H-1 is the Organizational Chart for PROTECO. All employees except the maintenance personnel and the security guards are directly

FIGURE H-1

The present organizational chart for the PROTECO facility is shown in Appendix H.3.

involved with the handling of hazardous wastes. Maintenance personnel (i.e., mechanics and welders) may work in the various waste treatment, storage or disposal areas, but normally do not handle the hazardous wastes directly. Security guards never handle the wastes directly, however, they must be familiar with the facility layout, operations and organization to be able to respond to an emergency situation.

The general manager's responsibilities at the facility includes insuring facility compliance with the RCRA regulations. This job does not involve actual handling of hazardous wastes. The facility chemist shares the general manager's responsibility for facility compliance with the RCRA regulations and is also involved in the actual handling of hazardous wastes under the facility's sampling and waste analysis program.

H-3 Training Director [40 CFR 264.16]

The classroom portion of the personnel training program is directed by the Lab Manager. Lab Manager qualifications include a B.S. degree in chemistry. The Lab Manager is familiar with all PROTECO treatment, storage, and disposal procedures and processes, the hazardous wastes accepted by the facility, safe procedures and equipment for handling hazardous materials and the RCRA and EQB hazardous waste regulations.

On-the-job training is provided by the facility supervisors who are extremely knowledgeable concerning the hazardous waste treatment procedures and processes. These supervisors are ultimately responsible for determining if an employee has mastered the skills necessary to perform the job tasks.

H-4 Relevance of Training to Job Position [40 CFR 264.16(c)(3)]

The Lab Manager is responsible for conducting hazardous waste management training programs including contingency plan implementation and emergency response procedures, to all waste handling personnel. A relatively small number of individuals are in supervisory and decision-making positions with a degree of authority and responsibility which warrants broad training in all aspects of hazardous waste management pertinent to their facility. Therefore, in order to provide the needed training to personnel at the levels that are relevant to their positions within the facility, the training program is tiered.

For example, the level of instruction which management personnel receive should be reasonably comprehensive and should constitute a relatively detailed overview of all pertinent aspects of hazardous waste management. Other personnel, having more limited spheres of activity, responsibility and authority, are trained at a level less comprehensive than that applicable to management personnel. Furthermore, depending on the specific position, training in one or more areas may not be necessary. Figure H-2 describes the level of training received by various personnel employed at the facility. Appendix H.4 provides a typical outline of the training received by each of these job positions.

H-5 Emergency Response Training [40 CFR 264.16(1)(3)]

This training program is designed to ensure that personnel not only handle hazardous wastes in a safe manner but are also able to properly respond to emergency situations. The program trains hazardous waste handling/management personnel to maintain compliance with RCRA under both normal operating conditions and emergency situations. Personnel attend information lectures and receive on-the-job training drills in the field (i.e., fire fighting, spill response, communications). These training drills are held at least twice a year.

Training elements addressing non-routine and emergency situations include:

- Procedures for locating, using, inspecting, repairing and replacing facility safety, emergency and monitoring equipment
- Emergency communication procedures and alarm systems
- Response to spills or releases

FIGURE H-2

APPLICABLE TRAINING

	TRAINING FOR PERSONNEL SAFETY	CONTINGENCY PLAN	EMERGENCY PROCEDURES	WASTE HANDLING AND STORAGE PROCEDURES	TREATMENT FACILITIES OPERATION/MAINT.	INSPECTION PROCEDURES	FACILITY SECURITY	WASTE ANALYSIS PLAN	DOT REQUIREMENTS	RECORD KEEPING
GENERAL MANAGER	C	C	C	C	C	C	C	C	C	C
FACILITY CHEMIST	C	C	C	C	C	C	C	C	C	C
FIELD SUPERVISOR	C	C	C	C	C	C	C	B	C	C
OPERATION SUPERVISOR	B	C	C	C	C	C	B	B	B	C
EQUIPMENT OPERATOR	B	B	B	B	B					
WASTE HANDLER	B	B	B	B	B					
MAINTENANCE STAFF	B	B	B							
TRANSPORTATION STAFF	B	B	B						C	C
SECURITY GUARDS		B	B			B	C			
CLERICAL STAFF			B							C

C - COMPREHENSIVE INSTRUCTION

B - BASIC INSTRUCTION

- Response to fires or explosions
- Procedures to be followed to remove a surface impoundment from service
- Response to contamination incidents
- Decontamination of equipment
- Shutdown of operations
- Personnel protective equipment
- Procedures for evacuation

H-6 Personnel Training Manual [40 CFR 264.16(a)(1) and (3)]

In addition to the program already developed at PROTECO for training employees in the safe handling of hazardous wastes, PROTECO organized the information into a "Personnel Training Manual". Provisions have been incorporated by the facility for updating or revising the text as necessary to ensure compliance with all regulations applicable to the facility (OSHA, RCRA, DOT) and with the terms of the RCRA Part B permit. An outline of the training manual is shown in Figure H-3. The complete training manual is given in Appendix H.1.

All management personnel and supervisors will be provided with a copy of the training manual. A copy of the manual will also be kept at the Penuelas office for employees to review, and as a result, it is also available to EPA officials for review.

FIGURE H-3

OUTLINE OF PERSONNEL TRAINING MANUAL

I. Introduction

A. The Resource Conservation and Recovery Act--RCRA

B. 40 CFR Part 262, 263, 264, 270

C. Environmental Quality Board (EQB) Regulations

D. RCRA Part B Permit (once received)

II. Prevention of Hazard

A. Hazardous Wastes Accepted at the Facility

B. Associated Hazards

C. Personnel Protective Equipment

III. Working Elements of the Facility Program

A. Waste Analysis and Sampling Techniques

B. Security

C. Inspections

D. Description of Container Storage Area

E. Description of Tank Storage Area

FIGURE H-3 (CONTINUED)

OUTLINE OF HAZARDOUS TRAINING MANUAL

F. Standard Operating Procedures

1. Pozzolanic Immobilization
2. Anaerobic Digestion
3. Neutralization/Evaporation

G. Key Terms of the Permit

H. Recordkeeping and Reporting Requirements

I. DOT Requirements

1. Labeling
2. Marking

IV. Emergency Procedures and Contingency Plans

A. Emergency Coordinators (Primary and Alternates)
B. Emergency Communications/Phone Numbers and Alarms
C. Emergency Response Procedures
D. Location, Maintenance, Inspections and Use of Emergency Equipment
E. Response to Contamination Incidents
F. Response to Fires or Explosions
G. Response to Removal of a Surface Impoundment from Service
H. Shutdown of Operations/Evacuation
I. Required Report

This manual is used as the basis for the annual training of all employees already trained by PROTECO and in conducting the training of all new employees. During the training program, employees are instructed on the following topics:

- the purpose of RCRA and importance of maintaining compliance with the regulations
- the hazardous nature of the wastes stored, treated or disposed of at the facility
- proper handling and storage procedures for these wastes emergency procedures and contingency plans.

This manual will be used as a framework for training PROTECO personnel in the proper procedures, equipment and systems to be used in managing hazardous wastes.

A brief description of each section of the training manual follows

Section 1 - Introduction

This section focuses on the Resource Conservation and Recovery Act (RCRA) and the regulations stemming from this act. The regulatory framework for classifying hazardous waste, setting operational standards and achieving compliance are explored. In addition, standards for generators and transporters are discussed. The RCRA permit for PROTECO (once it is received) will be reviewed and studied as part of this course to ensure that all employees are familiar with its terms and content.

Section 2 - Hazardous Wastes

This section focuses on the hazardous wastes treated, stored or disposed of at PROTECO and the nature of their hazardous characteristics. In this context, the terms toxicity, reactivity, corrosivity and ignitability will be defined. Employees are taught how wastes can be harmful to human health and the environment. In addition, the course introduces the use of personnel protective equipment and other safety equipment used to prevent accidental exposures to workers and releases to the environment.

Section 3 - Facility and Process Description

This section focuses on the types of hazardous wastes that are treated and disposed of in the various treatment operations (i.e., stabilization/-fixation and neutralization, storage and disposal operations and the procedures for maintaining compliance with the RCRA permit (i.e., record-keeping, inspections and security). A site diagram showing the dimensions, capacity and relative position of each treatment, storage and disposal area are included in the manual.

Training for normal or routine operating conditions includes the following topics

- DOT regulations for marking and labeling
- proper operation and maintenance of the treatment, storage and disposal facilities
- standard operating procedures
- purpose and use of scheduled inspections
- purpose and use of security and communications systems
- proper handling of ignitable or incompatible wastes
- procedures to prevent hazards
- monitoring requirements for tracking and recording the operation of the facility
- sampling and analysis program
- recordkeeping requirements and procedures

Section 4 - Emergency Procedures and Contingency Plan

The fourth section of the training manual provides detailed instruction on the steps to be taken in the event of an emergency such as a waste spill, fire, explosion, damage to a tank or surface impoundment or damage from wind and storms. The emergency coordinator is clearly identified as are emergency phone numbers and directions for locating and using on-site emergency equipment. In addition, details of the contingency plan are enumerated.

This manual is used in the classroom for both introductory training and annual review. All personnel involved in hazardous waste management are required to complete 20 hours of classroom instruction in addition to 6 weeks on-the-job training. In addition, personnel complete an 8-hour classroom review training session once a year.

H-7 Implementation of Training Program [40 CFR 264.16(b),(c)]

All personnel currently involved in hazardous waste activities at the facility have either been fully trained at the time of this submittal or are presently being trained under the direct supervision of a fully trained staff member.

All new personnel will complete this training program by using the personnel training manual within 6 months of assignment to any of the hazardous waste treatment/storage facilities or within 6 months of their date of employment, whichever is later. No employee hired to work at the facility will work unsupervised prior to completion of the training program.

Employees have been required to attend personnel training sessions at least annually for review. The updated personnel training program provides an annual review using the personnel training manual and discusses the following subjects:

1. All hazardous wastes currently being handled at the facility, noting any changes in waste type, volume, source, characteristics or location that have occurred during the past year.

2. The status of storage and operating conditions and procedures, noting any areas where there are problems or potential for problems. Employees participate in developing effective solutions.

3. The requirements contained in the facility's RCRA permit, noting any changes that have occurred during the past year. Areas where maintenance of compliance is a problem are identified and discussed, and effective solutions are sought.

4. Incidents that have occurred in the past year that warranted use of contingency plans and/or emergency action. This review focuses on the cause of the incident and identification of steps to prevent or to ensure better handling of such events in the future.

Records documenting the job title for each position, job descriptions, names of employees, and completed training programs (both introductory and review) are and will be maintained at the facility. These records will be kept until closure of the facility for current employees and for three years from the date of an individual employee's last working day for former employees.

1. GENERAL HAZARDOUS WASTE TRAINING

1.1 Hazardous Waste Management

Industrial chemicals and materials have become an integral part of our society. In the production of these industrial chemicals and the manufacturing of various industrial materials, by-products are created. Some of these by-products are pollutants, a material which enters the environment either directly or indirectly. Many of these by-products can be hazardous to human health and the environment if improperly handled or disposed of. During the 1960s, the public became more aware of the need to preserve the environment, consequently, to more effectively meet the needs of a growing pollution problem, the Federal Government established the United States Environmental Protection Agency (EPA) on July 9, 1970. Since that time, many Federal laws have been adopted concerning environmental pollution. Among the more prominently known Federal environmental legislation promulgated in the 1970s are the:

- National Environmental Policy Act.
- Clean Air Act.
- Hazardous Materials Transportation Act.
- Occupational Health and Safety Act.
- Clean Water Act of 1977.
- Safe Drinking Water Act.
- Toxic Substances Control Act.
- Resource Conservation and Control Act.
- Comprehensive Environmental Response, Compensation and Liability Act of 1980.

These acts have in turn spawned a host of Federal regulations. These regulations are staggering in their number and in many cases bewildering in their complexity.

Federal laws and regulations are not the whole story. There are a great number of state and local laws, ordinances, rules and regulations which are in effect and which will continue to change to meet the needs of an ever changing problem. In many cases, state environmental agencies have the authority to run the Federal program on air pollution, water pollution and hazardous waste management.

As a matter of fact, the hazardous waste management program is one of the newest and most advanced of the Federal programs. Hazardous wastes are the by-products of the goods and services which accompany modern life in a technically advanced society. An EPA survey found that 150 million metric tons of the annual production of about 344 million metric tons of industrial wastes are hazardous. Such wastes include toxic chemicals, acids, caustics, solvents and other potentially harmful materials.

Hundreds of instances of damage to health and the environment resulting from improper hazardous waste management have been reported. The damage occurs in various ways: injury due to direct contact with the waste; fire and explosion; contaminated ground waters and surface waters; air pollution; and poisoning via the food chain. In order to more effectively control hazardous waste Congress adopted the Resource Conservation and Recovery Act (RCRA) in 1976, requiring EPA to establish a regulatory program to control hazardous waste. Section 3001 of the Act called for the control of hazardous waste from "cradle to grave" or from place of origin to disposal. EPA accomplished this by using a "pathways" approach, so called because the movement of the waste destined for storage, treatment or disposal is constantly being monitored and controlled.

The first phase of the national hazardous waste management effort consisted of promulgation of the Hazardous Waste Management Regulations. The regulatory program includes: identification of wastes; standards for generators and transporters of hazardous waste; performance, design and operating standards for facilities that treat, store or dispose of hazardous waste., systems for issuing permits for such facilities; and guidelines for states for the management of their own hazardous waste programs.

The second phase of the national hazardous waste management effort consists of EPA investigations to identify dangerous and abandoned "dump sites". Under RCRA, EPA can force the owner or operator of such a site to clean it up if it presents an "imminent or substantial" danger to human health or the environment. Unfortunately, it can be very difficult to find past owners or operators of abandoned sites and cleanup of such sites moves very slowly.

The third phase consists of the 1979 legislative proposal, termed "Superfund". the main purpose of this Act is to provide funds that will permit Federal and State governments to deal with the consequences of uncontrolled and abandoned disposal sites, as well as spills of oil and hazardous substances. Congress passed the Comprehensive Environmental Response, Compensation and Liability Act in 1980 and therefore Superfund went into effect during the spring of 1981.

Under Superfund, states listed uncontrolled and abandoned sites posing substantial danger to human health and the environment. These sites were then ranked by EPA. EPA has listed 406 hazardous waste sites on the National Priority List.

With respect to the development of a hazardous waste management program for the types of operations engaged in by PROTECO, the most applicable federal and state regulations include the Resource Conservation and Recovery Act (RCRA), Toxic Substances Control Act (TSCA), Clean Water Act (CWA), Clean Air Act (CAA), Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), the Hazardous Materials Transportation Act, the Environmental Protection Agency Regulations for Hazardous Waste Management and the Puerto Rico Environmental Quality Board Regulation for the Control of Hazardous and Non-Hazardous Solid Wastes.

1.2 The Resource Conservation and Recovery Act

The modern history of solid waste management began with the 1965 enactment of the Solid Waste Disposal Act, the first major legislative tool for regulating the disposal of solid wastes. The Act primarily established a national resource and development program for improved methods of proper waste disposal. Grants were available to conduct surveys of solid waste disposal practices and related problems.

The Solid Waste Disposal Act was amended by the Resource Recovery Act of 1970 (P.L. 94-512) enacted October 26, 1970. A new emphasis was placed on resource recovery and grants were available for resource recovery oriented programs.

On October 21, 1976, the Resource Conservation and Recovery Act (RCRA) (P.L. 94-580) was enacted to create a federal hazardous materials disposal program governing not only solid wastes, but also the disposal of liquids, semisolids and gaseous materials resulting from industrial, mining, agricultural and commercial activities. The Act is very broad and includes provisions for improved solid waste management, resource recovery, and regulation of hazardous waste. RCRA is divided into eight subtitles with sub-title C providing for the full control over hazardous wastes from the point of generation to their eventual treatment, storage or disposal.

1.2.1 State Action Encourage

RCRA encourages states to create their own regulatory programs. In order to be authorized by the EPA to run the federal program, state regulations may not be any less stringent than those promulgated by EPA. In addition, state programs must also provide for closing or upgrading all open dumps. EPA can also take direct action if an imminent hazard is created by disposal practices. Puerto Rico has received Phase I authorization from EPA and are responsible for the regulation and enforcement of the interim status (265 regulations).

1.2.2 Citizen Action

RCRA provides for extensive state and EPA consultations with the public and for citizen involvement in promulgating guidelines; listing of materials as hazardous; establishing guidelines for state plans; promulgating criteria for listing open dumps; and establishing standards for generators transporters, and disposers of hazardous materials. Citizen suits are also authorized.

1.2.3 Hazardous Wastes

The most important aspect of RCRA was the creation of a primary federal role with respect to control of land disposal and the storage and treatment of discarded materials which are deemed to be hazardous. EPA was required to list hazardous materials with reference to toxicity, persistence, degradability, potential accumulation, flammability, corrosiveness, and "other hazardous characteristics" which could result in a health effect or environmental hazard if the material is not properly handled. Persons are required to notify EPA (or a State agency administering the program) for each disposal site operated covering any materials which are generated, transported, disposed of, treated, or stored and which are on the EPA list. Subsequently, EPA or the administering State agency must be notified within 90 days following any revision in the list or change in location practices if a hazardous substance is handled.

At the same time, initial permit applications must be made to EPA for facilities which dispose of, treat or store materials on the EPA list. These applications will be treated by EPA as permits until a final administrative disposition is made unless the applicant has failed to furnish information reasonably required or which was requested by EPA to process the application. Therefore, it is important that initial filings cover all possible materials and make full and complete disclosure.

The regulations published by EPA prohibit the treatment, storage or disposal of such listed hazardous wastes except in accordance with the regulations. In addition, these regulations set standards for generators, transporters, and persons treating, storing, or disposing of materials listed by EPA.

1.2.4 Inspection

EPA personnel are authorized by Section 30007 of the Act to examine the establishment and records of any person who produces, stores, treats, transports, disposes of "or otherwise handles hazardous wastes" at reasonable times. In addition, personnel are authorized to obtain samples of any such hazardous wastes. All reports, records or information obtained during an inspection are available to the public except where "Confidentiality" has been granted by EPA.

1.2.5 Civil and Criminal Penalties

Although the EPA Administrator is said to have the power to "assess a penalty" in connection with a compliance order, "taking into account the seriousness of the violation and any good faith efforts to comply with the applicable requirements,'' no specific penalty parameters are set forth. Where the "violator fails" to take corrective action within the times specified in an order, however, a civil penalty of up to $25,000 for each day "of continued non-compliance" is provided.

Criminal sanctions apply to "any person who knowingly" (a) transports any hazardous waste to a facility which does not have a permit; (b) treats, stores or disposes of listed hazardous waste without having obtained a permit; or (c) makes any false statement in any application, label, manifest, record, report, permit, "or other" document filed, maintained, or used for purposes of compliance. On conviction, a fine of up to $25,000 for each day of violation and imprisonment of up to one year may be imposed and, after the first conviction, the fine can be increased up to $50,000 per day of violation and two years imprisonment or both. Second and subsequent offenses are felonies.

1.3 The Federal Regulations

1.3.1 Definition of Solid Waste

The term "solid waste" means any garbage, refuse, sludge from a waste treatment plant, water supply treatment plant, or air pollution control facility and other discarded material, including solid, liquid, semi-solid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations, and from community activities, but does not include solid or dissolved material in domestic sewage, or solid and dissolved materials in irrigation return flows or industrial discharges which are point sources subject to permits under Section 402 of the Federal Water Pollution Control Act, as amended (86 State 880), or source, special nuclear, or by-product material as defined by the Atomic Energy Act of 1954, as amended (68 State 923).

1.3.2 Hazardous Waste Identification

A waste is considered to be hazardous if it is listed in the regulations or exhibits at least one of the four hazardous waste characteristics of ignitability, corrosivity, reactivity, or toxicity. This regulation lists over 700 wastes and waste streams--mixed discharges of waste.

EPA may add or delete substances from the list, and also may add or delete any of the characteristics used to identify hazardous wastes not on the list.

This section also defines an "empty container". Most containers that have contained a hazardous substance are considered an "empty" container and not hazardous if there is less than one inch of material left in the bottom of the container. Some containers, however, must be triple rinsed before they can be considered non-hazardous and acceptable for reuse.

Responsible disposal of hazardous waste cannot take place without detailed knowledge of what makes up a shipment of waste. Disposal companies will not accept a waste unless a thorough profile is worked up and submitted.

1.3.3 Hazardous Waste Generators

The first responsibility of a generator of hazardous waste is to file a notification form to EPA about the waste generated at the facility and to obtain an EPA ID number from the federal government. Generators are responsible for the following activities:

1. To determine if their waste is hazardous;

2. To label and mark all waste containers;

3. To keep all hazardous waste records;

4. To find proper storage, treatment, and/or disposal facilities;

5. To ship all hazardous waste according to all applicable requirements of the DOT regulations; and

6. To prepare transportation manifest to keep track of the waste at all times.

Generators who store on-site for 90 days are also responsible for the inspection of the storage area weekly, for providing personnel training, and to have an operable hazardous waste contingency plan. A general summary of the regulations with which generators are required to comply is listed in Table 1.

1.3.4 Hazardous Waste Transporters

The transportation regulation requires all transporters of hazardous waste to obtain an EPA ID number and then notify EPA of their activities. Transporters are not allowed to transport hazardous wastes without having an ID number or without obtaining a hazardous waste manifest from a generator of hazardous waste. They must comply with all applicable hazardous waste regulations and all DOT requirements. Transporters are also responsible for the cleanup of any spills that occur during the transport of a waste from one location to another. However, if the transporter cannot afford to clean up the spill, the responsibility of cleanup falls back to the generator who contracted to have his waste transported by the transporter. A general summary of the regulations with which transporters are required to comply is listed in Table 2.

TABLE 1

SUMMARY OF GENERATOR REQUIREMENTS

Determine whether waste is hazardous

Obtain EPA identification number

*Do not store waste on site for more than 90 days (unless a storage facility permit is obtained)

Package, label, mark, and placard each package in accordance with DOT and EPA regulations

Prepare a manifest for off-site shipment

Submit an Annual Report (currently on-hold)

Submit Exception Reports for unreturned manifests

* Note: A generator becomes a storer if waste is accumulated on-site for more than 90 days. For this situation, a storage permit is required.

TABLE 2

SUMMARY OF TRANSPORTER REQUIREMENTS

- Obtain EPA identification number
- Comply with the manifest system
  - must not accept hazardous wastes without a manifest
  - sign and date the manifest and return a copy to generator
  - manifest must accompany the hazardous waste shipment
  - delivery the wastes to the designated facility or next transporter
  - retain copy of manifest for three years
- In the event of a discharge
  - take immediate action
  - notify the National Response Center
  - clean up the discharge
  - submit report

1.3.5 Hazardous Waste Storage, Treatment and Disposal Facilities

All treatment, storage, and disposal facilities (TSDF's) were required to notify EPA of their activities and to receive an EPA ID number. By November 19, 1980, all TSDF's were to have filed for an interim status permit. This permit requires a TSDF to operate their facility according to the interim status regulations. This permit allows the facility to continue operating while they upgrade their facility to meet final permit regulations. All facilities that wish to continue operating will eventually apply for a final permit and will have to meet the final permit standards. A general summary of the regulations with which TSDF's are required to comply is listed in Table 3.

1.3.6 Enforcement

The most important aspect of the EPA program is identifying the hazardous waste and the proper management of it. The generator is held responsible for most of the program. The generator is responsible for selecting a legitimate transporter, TSDF, and for notifying EPA if a shipment of waste is not received at a TSDF. Because the generator plays such a primary role in the program, EPA's monitoring and enforcement efforts will be focused on them.

Section 3008 of RCRA authorizes EPA to prosecute any person who fails to comply with any requirement of the regulations. Violations can result in civil or criminal penalties or both. Fines up to $25,000 per day per violation can be imposed and up to one year imprisonment or both.

1.4 Hazardous Wastes

Hazardous wastes are chemical substances which can cause harm, contaminate, or kill living organisms due to ignitable, corrosive, reactive or toxic characteristics. These wastes are by-products of chemical and industrial production and are considered wastes because they cannot be reused, recycled or reclaimed for other use.

TABLE 3

SUMMARY OF TREATMENT, STORAGE, DISPOSAL FACILITIES REQUIREMENTS*

- Obtain EPA identification number
- Develop and follow an inspection plan
- Develop a waste analysis plan and obtain detailed analysis of representative samples
- Comply with security requirements
- Train facility personnel
- Implement precautions for ignitable, reactive, or incompatible wastes
- Comply with preparedness and prevention requirements
- Prepare contingency plans and emergency procedures
- Comply with the manifest system
- Maintain records, prepare required reports
- Establish a groundwater monitoring program
- Submit closure and post-closure plans
- Comply with standards applicable to specific facility type
- Comply with financial requirements

* Note: Generators or transporters that store hazardous waste on-site for more than 90 days are considered TSDs and must obtain an EPA storage permit.

Hazardous wastes have four major characteristics:

TOXIC: Poisonous, potentially harmful to human health, can cause cancer, can bio-accumulate, can harm or kill fish or wildlife.

CORROSIVE: A substance which can corrode a storage container or can damage human tissue if touched.

REACTIVE: An unstable substance that can react if exposed to heat, shock, air or water. Reaction include explosions.

IGNITABLE: A substance which could explode, catch on fire or emit toxic gases or fumes into the environment.

There are five basic ways that improperly stored, transported or disposed of hazardous wastes enter the environment and cause environmental damage or danger to human health:

1. Groundwater contamination via percolation through the soil (leaching) from land disposal sites or poor disposal practices;

2. Surface water contamination through runoff (storm, agricultural);

3. Poisoning via direct contact (spills during transit or in storage facilities);

4. Indirectly through poisoning via the food chain (plants to fish to humans), or

5. Fire and explosion.

1.5 DOT Regulations

According to the Department of Transportation (DOT) regulations, no person may offer or accept a hazardous material for transport in commerce within the United States unless the material is properly classed, described, packaged, marked, labeled, and in good condition for shipment. Therefore, the EPA hazardous waste management regulations require all hazardous waste to be packaged, labeled, and marked according to the applicable DOT requirements.

The DOT regulations have a Hazardous Materials Table that designates the materials listed therein as hazardous materials for the purpose of transportation of those materials in commerce. The table identifies the proper shipping name, the hazard class of each listed material, and specifies or references the DOT requirements pertaining to its packaging, labeling, and transport. The table also lists the identification numbers assigned to each hazardous material.

Proper shipping names are the names that are to be used to describe a hazardous material. They can be expressed in several different ways. Use of the correct technical name is the preferred method. However, if the correct technical name is not shown, or is not appropriate, selection must be made from the general descriptions or "not otherwise specified" (NOS) entries corresponding to the specific hazard class of the material being shipped. Again, the name that most appropriately describes that material must be used, e.g., an alcohol not listed by name in the Hazardous Material Table must be shipped as "Alcohol, NOS", rather than "Flammable Liquid, NOS".

The proper shipping name for a hazardous material that is a hazardous waste must include the word "waste" preceding the name of the material. For example, waste toluene would have the proper shipping name "Waste Toluene" rather than just "Toluene".

The hazard class defines the hazardous nature of the material. Section 183.2 of the DOT regulations lists the hazardous classes in order of priority based on exposure to conditions normally incident to transportation (see Table 1 for DOT Hazard Class Priority List). The hazard class defines how to label the container and how to placard the truck that is to be used for transporting the hazardous material. The two hazard classes that would commonly be used for hazardous waste generated at the plant would be flammable liquid or ORM-E.

An "other regulated material" (ORM) is a material that may pose an unreasonable risk to health and safety or property when transported in commerce or does not meet any of the definitions of the other hazard classes specified in the DOT regulations. There are five ORM classes, ORM-A,B,C,D or E.

ORM-E is the new hazard class developed by DOT for EPA rules and regulations. Materials in the ORM-E class include hazardous wastes and hazardous substances.

The DOT identification numbers are specific numbers assigned to each hazardous material. The identification number is another way to identify the hazardous material during transport. Those numbers that are preceded by an "UN" are associated with descriptions considered appropriate from international shipments, as well as domestic shipments. Those numbers preceded by a "NA" are associated with descriptions that are not recognized for international shipment except to and from Canada.

A hazardous material transportation label is a color coded sign with a hazardous warning word written upon it, attached to a package or container which contains hazardous material. The label identifies the hazard associated with the material which is being shipped, and alerts personnel involved with the transport of the package or container to the potential hazards.

All packages, containers, or overpacks containing a hazardous material for transportation shall be labeled when required with labels prescribed for the material. Each package that contains a material classified as a flammable liquid must have a flammable liquid label. These labels are red in color with the printing and flammable symbol in black. Hazardous wastes that would have the hazard label "flammable liquid" would include waste toluene, acetone, and paint.

Each package containing a material classed as ORM-A,B,C,D, or E must be plainly, durably, and legibly marked on at least one side or end with the appropriate ORM designation immediately following or below the proper shipping name of the material. The appropriate ORM designation must be placed within a rectangle that is approximately 1/4 inch larger on each side than the designation.

Marking means applying the descriptive name, instructions, cautions, weight or specification marks or a combination thereof required by the Hazardous Material Transportation Regulations (HMTR). The RCRA regulations require generators to mark each package of hazardous waste in accordance with the applicable DOT regulations.

Generally, each package that contains a hazardous material (i.e., hazardous waste) must be marked with the proper shipping name and the identification number. The marking must be durable, in English, and printed on or affixed to the surface of a package or on a label, tag, or sign.

The RCRA regulations also requires each package or container of 110 gallons or less to be marked with the following words or information displayed in accordance with the DOT regulation, 49 CFR 172.304:

> HAZARDOUS WASTE-Federal Law Prohibits Improper Disposal. If found, contact the nearest police or public safety authority of the United States Environmental Protection Agency.
>
> Generator's Name and Address ______________________
>
> Manifest Document Number ______________________

Under RCRA regulations, an important provision centers on the requirement of a manifest system to keep track of hazardous waste from the time it leaves a site where it is generated to the time when it is stored, treated, or disposed. The hazardous waste manifest is a required shipping paper under both the DOT and EPA rule and regulations.

The hazardous waste manifest must be filled out by a generator before a transporter can accept a load of hazardous waste for shipment. The manifest must include the name, the address, and the EPA ID number of the generator, transporter, and the treatment, storage, and/or disposal facility. On the manifest, the generator must also fill out the following information for each waste that is to be shipped: the number of containers; the type of containers; the proper shipping name, hazard class, and DOT ID number; the EPA hazardous waste number; the total quantity and unit of the waste; and the weight of the waste.

The manifest must then be signed and dated by the generator before transportation. When the transporter accepts the waste for delivery, he/she must also sign and date the manifest, leave one copy of the manifest with the generator, and keep the remaining copies with him/her. Hazardous waste cannot be shipped without a manifest and, of course, the manifest must accompany the load at all times.

When the transporter arrives with the load of waste at the storage, treatment, and/or disposal facility, the owner or operator of such a facility must sign and date the manifest before the transporter can unload his/her truck. The owner or operator of the facility then sends the original copy of the manifest back to the generator. All three, the generator, transporter and the owner or operator of a facility, must keep a copy of the manifest for three years.

1.6 Recordkeeping and Reporting

The TSD facility must keep the following records and submit the following reports to the Region II Administrator:

1. The TSD facility must keep a copy of each manifest signed and dated by the generator, transporter, and TSD facility. The TSD notes any significant discrepancies on the manifest and returns one (1) copy to the transporter immediately and sends one (1) copy to the generator within thirty (30) days of delivery. The manifest must be retained on record for a period of at least

TABLE 4

DOT HAZARD CLASS PRIORITY LIST

Radioactive Material
Poison A
Flammable Gas
Non-Flammable Gas
Oxidizer
Flammable Solid
Corrosive Material (liquid)
Poison B
Corrosive Material (solid)
Irritating Materials
Combustible Liquid (containers exceeding 110 gallons)
ORM-B
ORM-A
Combustible Liquid (containers with capacity of 110 gallons or less)
ORM-E

three (3) years from the date the waste was accepted by the transporter for shipment.

2. The TSD facility must attempt to reconcile discrepancies in the manifest with generator or transporter. If unresolved after fifteen (15) days, a letter must be submitted to the Region II Administrator describing discrepancy, reconciliation attempts, and a copy of the manifest.

3. The TSD facility must submit to the Region II Administrator a written report on any incident that requires implementation of the contingency plan within 15 days of the incident. (See the hazardous waste contingency plan for details.)

4. The TSD facility must maintain the following operating records:

   a. description, quantity of each waste received;

   b. methods, dates of treatment, storage, disposal of each waste;

   c. location and quantity of each waste within the facility;

   d. location, quantities recorded on a map or diagram of each cell or disposal area;

   e. information must include cross-references to specific manifest document numbers;

   f. records and results of waste analyses, trial tests, and monitoring;

   g. summary reports of all incidents that require the implementation of the contingency plan;

   h. records, results of inspections; and

   i. closure cost and post-closure care estimates.

5. The TSD facility must keep a copy of records of waste disposal locations and quantities submitted to the Region II Administrator and local land authority upon closure of facility.

6. The TSD facility must submit a "biennial report" to the Region II Administrator no later than March 1 of even-numbered years, covering wastes managed during previous odd-numbered years. The report shall include EPA identification number, name, address of facility; year covered by report., identification number, address of generator; description, quantity of each waste; method of storage, treatment, disposal; monitoring date; most recent closure and post-closure estimate; and certification by operator.

7. The TSD facility must maintain the following personnel records at the facility:

   a. Job title and employee in each position involved with hazardous waste management;

   b. Written job description, including requisite skill, education, qualifications for each job title;

   c. Documentation of completing training program; and

   d. Training records must be kept until facility closes or three (3) years after the last employment date.

1.7 <u>General Inspection Requirements</u>

The TSD facility is required to inspect for malfunctions, deterioration, operator errors, discharges, emergency equipment, security devices, and operating and structural equipment.

Table 5 is an inspection schedule summarizing the specific items and types of problems to be inspected, along with the frequency of inspection for each of the security and waste management areas.

The inspections must be recorded in the Inspection Logs and maintained by the facility for a period of at least three years. The record must include, at a minimum, the following information:

1. the date and time of the inspection;
2. the name of the inspector;
3. A notation of the observations made; and
4. The date and nature of any repairs or other remedial action.

The following summarizes the required inspection logs for the various facilities:

Figure	Facility Inspection Log
1	Safety and Emergency Equipment
2	Security Devices
3	Container Storage Area
4	Tank Storage
5	Daily Freeboard
6	Surface Impoundments
7	Immobilization
8	Raw Material
9	Construction

1.8 General Description of Hazardous Wastes

PROTECO treats, stores or disposes of a broad gamut of hazardous wastes including solids, slurries, sludges or liquids. The wastes stored at the facility can be generally grouped in the following categories as defined in 40 CFR Part 261:

Ignitable
Corrosive
Extraction Procedure (EP) Toxic
Toxic
Acutely Hazardous

FIGURE 1

PROTECCION TECNICA ECOLOGICA, INC.
SAFETY AND EMERGENCY EQUIPMENT INSPECTION LOG

Items to be Inspected	Date and Time	Name of Inspector	Observations and Remedial Action Taken
Absorbents Note amount on hand			
Absorbent Booms/Pads Note amount on hand			
Containment Drums Note amount on hand			
Eyewash Stations Check for water pressure, leaking, drainage			
Face Shields/Goggles Check for broken, dirty, amount on hand			

(0554B-1)

FIGURE 1 (CONTINUED)

PROTECCIÓN TECNICA ECOLOGICA, INC.
SAFETY AND EMERGENCY EQUIPMENT INSPECTION LOG

Items to be Inspected	Date and Time	Name of Inspector	Observations and Remedial Action Taken
Cartridge Respirator Check for broken, dirty, replace parts, spent chemical absorbent			
Fire Extinguishers Check by NFPA Standards			
First-Aid Equipment Check for items out of stock or inoperative			
Protective Clothing Check for holes, tears, dirty, check stock			
Showers Check for water pressure, leaking, drainage			

(0554B-2)

FIGURE 2

PROTECCION TECNICA ECOLOGICA, INC.
SECURITY DEVICES INSPECTION LOG

Items to be Inspected	Date and Time	Name of Inspector	Observations and Remedial Action Taken
Chain-Link Fence Inspect for corrosion, damage to chain-links or strands of barbed wire			
Barbed Wire Fence Inspect for corrosion, damage to barbed wire or wooden posts, fence still in place			
Warning Signs Inspect for corrosion, signs still in place, legibility			
Gates Inspect for corrosion, damage to chain-links or barbed wire strands; corrosion to lock, sticking			

(0554B-3)

FIGURE 2 (CONTINUED)

PROTECCION TECNICA ECOLOGICA, INC.
SECURITY DEVICES INSPECTION LOG

Items to be Inspected	Date and Time	Name of Inspector	Observations and Remedial Action Taken
Walkie-talkies and Radio-telephone Inspect to determine if equipment can transmit and receive			

FIGURE 4

PROTECCION TECNICA ECOLOGICA, INC.
CONTAINER STORAGE AREA INSPECTION LOG

Items to be Inspected	Date and Time	Name of Inspector	Observations and Remedial Action Taken
Container Placement Inspect for wrong storage area, incompatible wastes, number of containers in each area			
Container Seals Inspect for open lids, bungs missing, damage to lids			
Container Marking Inspect for improper labels, labels or markings faded, labels damaged or missing			
Containers Inspection of containers for leaks, deterioration, pressurization, structural defects			

FIGURE 4 (CONTINUED)

PROTECCION TECNICA ECOLOGICA, INC.
CONTAINER STORAGE AREA INSPECTION LOG

Items to be Inspected	Date and Time	Name of Inspector	Observations and Remedial Action Taken
Base/Foundation Inspect for cracks, spalling, erosion, wet spots, settlement			
Warning Signs Inspect for signs missing or damaged			
Base/Foundation Inspect for cracks, spalling, erosion, set spots, settlement			
Tank Shell and Bottom Inspect for corrosion, wet spots, cracks, buckles, bulges, discoloration			

FIGURE 4 (CONTINUED)

PROTECCION TECNICA ECOLOGICA, INC.
CONTAINER STORAGE AREA INSPECTION LOG

Items to be Inspected	Date and Time	Name of Inspector	Observations and Remedial Action Taken
Tank Valves, Nozzle, Joints Inspect for cracks, corrosion closure			
External Supports Inspect for cracking, corrosion			
Ground Surface Inspect for cracks, deterioration, wet spots			
Pipe Connections Inspect for external corrosion, cracks, distortion			

(0554B-7)

FIGURE 6

PROTECCION TECNICA ECOLOGICA, INC.
SURFACE IMPOUNDMENT INSPECTION LOG

Inspector's Name: ______ Date: ______ Time: ______ Name of Impoundment: ______

Item to be Inspected	Status Acceptable/Unacceptable	Observations Made	Remedial Actions/ Taken and Date
Liquid Level Check freeboard, free-board slope, changes in liquid level, give date and status			
Dikes/Berms Check for structural integrity, erosion, cracking, leaks, wet spots			
Vegetation Erosion, deterioration wet spots, signs of vegetation damage			

(0554B-8)

FIGURE 6 (CONTINUED)

PROTECCION TECNICA ECOLOGICA, INC.
SURFACE IMPOUNDMENT INSPECTION LOG

Inspector's Name: ____________ Date: ______ Time: ______ Name of Impoundment: ____________

Item to be Inspected	Status Acceptable/Unacceptable	Observations Made	Remedial Actions/ Taken and Date
Discharge Hoses/Connections Check connections, cracking in hose, signs of leaks, other signs of deterioration			
Run-on Diversion Ditch Obstruction of flow, bank erosion, ponding, vegetative stress			
Runoff Diversion Drain Obstruction of flow, bank erosion, ponding, vegetative stress			

FIGURE 6 (CONTINUED)

PROTECCION TECNICA ECOLOGICA, INC.
SURFACE IMPOUNDMENT INSPECTION LOG

Inspector's Name: ____________ Date: ______ Time: ______ Name of Impoundment: ____________

Item to be Inspected	Status Acceptable/Unacceptable	Observations Made	Remedial Actions/ Taken and Date
Entrance Road			
Loss of gravel, deterioration of soil, excessive odors			
Leak Detection System			
Observation or evidence of liquid, pump operation, component integrity			

FIGURE 7

PROTECCION TECNICA ECOLOGICA, INC.
LANDFILL FACILITY INSPECTION LOG

Inspector's Name: ______________ Date: ______ Time: ______ Name of Impoundment: ______________

Item to be Inspected	Status Acceptable/Unacceptable	Observations Made	Remedial Actions/ Taken and Date
Dikes/Berms Check for structural integrity, erosion, cracking, leaks, wet spots			
Vegetation Erosion, deterioration wet spots, signs of vegetation damage			
Discharge Hoses/Connections Check connections, cracking in hose, signs of leaks, other signs of deterioration			

FIGURE 7 (CONTINUED)

PROTECCION TECNICA ECOLOGICA. INC.

Inspector's Name: ______________ Date: ______ Time: ______ Name of Impoundment: ______________

Item to be Inspected	Status Acceptable/Unacceptable	Observations Made	Remedial Actions/ Taken and Date
Run-on Diversion Ditch Obstruction of flow, bank erosion, ponding, vegetative stress			
Runoff Diversion Drain Obstruction of flow, bank erosion, ponding, vegetative stress			
Entrance Road Loss of gravel, deterioration of soil, excessive odors			
Leak Detection System Observation or evidence of liquid, pump operation, component integrity			

(0554B-12)

TABLE 6

WASTES, ASSOCIATES HAZARDS, AND BASIS FOR HAZARD DESIGNATION

Hazardous Waste	Hazard	Basis for Hazard Designation
Ignitable wastes includes oil, kerosene, thinners, solvent mixtures, alcohols	Ignitable	Ignitable, all wastes have a flash point less than 140°F, flash points range between 0°F and 140°F
Corrosive wastes includes NaOH, H_2SO_4	Corrosive	Corrosive, wastes have a pH less than 2 or greater than 12.5
Arsenic contaminated wastes	Toxic	EP Toxic, arsenic concentration greater than 5 ppm
Cadmium contaminated wastes	Toxic	EP Toxic, cadmium concentration greater than 1 ppm
Chromium contaminated wastes	Toxic	EP Toxic, chromium concentration greater than 5 ppm
Lead contaminated wastes	Toxic	EP Toxic, lead concentration greater than 5 ppm
Mercury contaminated wastes	Toxic	EP Toxic, mercury concentration greater than 0.2 ppm
Selenium contaminated waste	Toxic	EP Toxic, selenium concentration greater than 1 ppm
Silver contaminated waste	Toxic	EP Toxic, silver concentration greater than 5 ppm
Lindane solution waste	Toxic	EP Toxic, lindane concentration greater than 0.4 ppm
Spent halogenated solvents (primarily 1,1,1-trichloroethane, tetrachloroethylene)	Toxic	Listed waste F001, F002
Spent non-halogenated solvents (primarily acetone residues)	Ignitable	Listed waste F003

TABLE 6 (CONTINUED)

WASTES, ASSOCIATES HAZARDS, AND BASIS FOR HAZARD DESIGNATION

Hazardous Waste	Hazard	Basis for Hazard Designation
Spent non-halogenated solvents (primarily toluene)	Ignitable, Toxic	Listed waste F005
Wastewater treatment sludges from electroplating operations	Toxic	Listed waste F006
Leaded tank bottoms from the petroleum refining industry	Toxic	Listed waste K052
Spent pickle liquor from steel finishing operations	Corrosive, Toxic	Listed waste K062
Discarded acetone	Ignitable	Listed waste U002
Discarded benzene	Ignitable, Toxic	Listed waste U019
Discarded chloroform	Toxic	Listed waste U044
Discarded ethyl acetate	Ignitable	Listed waste U112
Discarded formaldehyde	Toxic	Listed waste U122
Discarded iodomethane	Toxic	Listed waste U138
Discarded lead acetate	Toxic	Listed waste U144
Discarded mercury	Toxic	Listed waste U151
Discarded methanol	Ignitable	Listed waste U154
Discarded methylene chloride	Toxic	Listed waste U080
Discarded phenol	Toxic	Listed waste U188
Discarded resorcinol	Toxic	Listed waste U201
Discarded tetrachloroethylene	Toxic	Listed waste U210

TABLE 6 (CONTINUED)

WASTES, ASSOCIATES HAZARDS, AND BASIS FOR HAZARD DESIGNATION

Hazardous Waste	Hazard	Basis for Hazard Designation
Discarded toluene	Ignitable, Toxic	Listed waste U220
Discarded 1,1,1-trichloroethane	Toxic	Listed waste U226
Discarded trichloroethylene	Toxic	Listed waste U228
Discarded xylene	Ignitable	Listed waste U239
Discarded sodium azide	Toxic	Listed waste P105

Hazardous wastes that are accepted for treatment, storage or disposal at the facility are summarized in Table C-3, and include the following:

Ignitable Mixtures (D001) - classified as hazardous due to their flammable characteristic. Wastes in this group have a flash point less than 140°F (60°C). The solvents accepted in this group include acetone, methanol, ethanol and isopropyl alcohol. In addition various oils, paint wastes, liquid tars, lacquer chip and lacquer base that are also flammable are accepted at the site.

Acidic Solutions (D002) - classified as hazardous due to their corrosive characteristics. All wastes in this category have a pH less than or equal to 2. The typical liquids accepted in this group includes acid cleaning solutions, ferric chloride solution, sulfuric acid and hydrochloric acid.

Alkaline Solutions (D002) - classified as hazardous due to their corrosive characteristics. All wastes in this category have a pH greater than or equal to 12.5. This group typically includes alkaline cleaning solutions, sodium hydroxide and other wastes generated in the production of Chlorox.

EP Toxic wastes - these are metal bearing wastes that are not listed in 40 CFR Part 261. These wastes are classified as hazardous due to EP Toxic concentrations of metals greater than or equal to the values listed in Table C-4. These wastes typically are generated from the production of hair and beauty products, electroplating operations and the manufacture of electrical products.

Spent Halogenated Solvents (F001, F002) - listed as hazardous wastes due to their toxic characteristics. Examples of this waste that are accepted at the site include methylene chloride, 1,1,1-trichloroethane, tetrachloroethylene and the still bottoms generated from their use in manufacturing operations. These wastes are generated primarily from the cleaning operations

MAXIMUM CONCENTRATION OF CONTAMINANTS FOR CHARACTERISTICS OF EP TOXICITY

EPA Number	Contaminant	Maximum Concentration (milligrams per liter)
D004	Arsenic	5.0
D006	Cadmium	1.0
D007	Chromium	5.0
D008	Lead	5.0
D009	Mercury	0.2
D010	Selenium	1.0
D011	Silver	5.0

associated with the production of pharmaceutical products and the manufacturing of electrical components.

Spent Non-Halogenated Solvents (F003, F005) - listed as hazardous wastes due to their ignitable and/or toxic characteristics. Examples of this waste accepted at the site include acetone, ethyl acetate, xylene and toluene. These wastes are typically generated in Puerto Rico from the production of pharmaceutical products and diagnostic medical devices.

Wastewater Sludges from Electroplating Operations (F006) - listed as hazardous due to their toxic properties. The hazardous constituents for which this waste is listed typically include cadmium, hexavalent chromium or nickel. These wastes are generated by various electroplating operations in Puerto Rico.

Pesticide Waste (D013) - classified as hazardous due to an EP Toxic concentration of lindane greater than 0.4 ppm. This waste is generated in Puerto Rico from a shampoo manufacturing operating process.

Leaded Tank Bottoms from the Petroleum Refining Industry (K052) - listed as a hazardous waste due to its toxicity and hazardous concentrations of lead. This waste is generated during the refining and storage of petroleum.

Spent Pickle Liquor from Steel Finishing Operations (K062) - listed as a hazardous waste due to its corrosivity and toxicity. The hazardous constituents for which this waste is listed typically include hexavalent chromium and/or lead.

Commercial Chemical Products (P105) - listed as hazardous due to the property of acute toxicity as defined in 40 CFR 261.33(e). These wastes are generated as hazardous wastes because they are off-specification products or are intended to be discarded by a manufacturer.

Commercial Chemical Products (U002, U112, U154, U239) - listed as hazardous due to the property of ignitability. These products are considered hazardous wastes because they have been discarded by a manufacturer or because they are off-specification products.

Commercial Chemical Products (U019, U220) - listed as hazardous due to the properties of ignitability and toxicity. These products are considered hazardous wastes because they have been discarded by a manufacturer or because they are off-specification products.

Commercial Chemical Products (U040, U044, U080, U122, U138, U144, U151, U188, U201, U210, U226, U228) - listed as hazardous due to the property of toxicity. These products are considered hazardous wastes because they have been discarded by a manufacturer or because they are off-specification products.

In 1983, the five (5) major waste streams processed at the PROTECO site were waste lindane solution (D013), corrosive wastes (D002), ignitable wastes (D001), lead bearing wastes (D008) and spent halogenated wastes (F001, F002).

2. CONTINGENCY PLAN TRAINING

The Proteccion Tecnica Ecologica (PROTECO) hazardous waste contingency plan is designed to minimize hazards to human health and the environment from fires, explosions or any unplanned releases of hazardous waste into the air, soil or surface water. The plan maps out the general strategies for dealing with both sudden (acute) and non-sudden events. The strategies involve a series of steps to be taken in response to an actual emergency incident and includes decision points where outside assistance may be required and the circumstances under which the evacuation of the facility is advisable. The strategies also identify the equipment and materials that are to be used if an incident should occur.

The facility emergency coordinator is the person designated by the facility to be responsible for coordinating response and recovery activities at the facility during emergencies. The actions that will be taken by the coordinator following the discovery of an emergency are incorporated into the plan.

Although the contingency plan provides a plan of action to be taken during and after an emergency situation has occurred, training of personnel is necessary to ensure that the correct actions are taken before, during, and after the emergency. The training of personnel includes procedures relevant to the positions in which individuals are employed so that they are able to respond to emergencies and are familiar with emergency procedures, emergency equipment and emergency systems. Training elements addressing non-routine and emergency situations include:

Procedures for locating, using, inspecting, repairing, and replacing facility emergency and monitoring equipment;

Emergency communication procedures and alarm systems;

Response to spills or releases;

Response to fires or explosions;

Procedures to be followed to remove surface impoundment from service.

Response to contamination incidents

Decontamination of equipment

Shutdown of operations

Personnel protective equipment

Procedures for evacuation

The hazardous waste contingency plan contains eight parts:

1. General Information: Provides pertinent information concerning Proteccion Tecnica Ecologica, Inc.

2. Emergency Coordinators: Includes the names, addresses and phone numbers of all personnel qualified to act as emergency coordinators during an incident at the facility.

3. Implementation of the Contingency Plan: Provides guidance to the emergency coordinator in making decisions on when to implement the contingency plan.

4. Emergency Response Procedures: Includes the actions to be taken when it becomes necessary to implement the contingency plan and the procedures for removing a surface impoundment from service.

5. Emergency Equipment: Includes lists of all emergency equipment located at the facility that can be used in the implementation of the contingency plan.

6. Coordination Agreements: Describes the emergency arrangements agreed to by the local police and fire departments.

7. Evacuation Plan: Describes evacuation of the facility should it be necessary to consider evacuation.

8. Required Reports: Lists the reports that must be completed after an incident requires the implementation of the contingency plan.

2.1 General Information

PROTECO is a hazardous waste management facility located approximately 3 miles off Road 385, 3 miles south from Km-3.5 and approximately 7 miles from Penuelas in the Commonwealth of Puerto Rico. The facility EPA identification number is PRD091018622. The facility is owned by Compania Ganadera del Sur, Incorporated. The general manager of the facility can be reached at (809) 836-2058 between 8 a.m. and 5 p.m. on weekdays. Enrique Negron, facility chemist, is the current primary emergency coordinator and can also be reached at (809) 836-2058 between 8 a.m. and 5 p.m. on weekdays. A summary of the general information is provided in tabular form in Table 10 for ease of use during an emergency situation.

The activities conducted by the facility include the treatment, storage and disposal of hazardous waste. The present hazardous waste storage operations at the PROTECO facility include The types of hazardous waste and an estimate of the annual quantity handled in each of these operations is provided in Table 11.

2.2 Emergency Coordinator

The PROTECO emergency coordinator is the person designated by the facility to be responsible for coordinating the response, control, cleanup and recovery activities at the facility during an emergency situation. He is responsible for the coordination of facility emergency personnel and for contacting outside emergency assistance. He decides how many personnel are needed, what equipment to use and what strategies to employ to achieve a safe, efficient and effective containment and cleanup. He keeps in contact with the facility general manager during an emergency situation to coordinate the need for additional outside help, replacement men and/or supplies. The coordinator is designated authority by PROTECO to commit the resources needed to carry out the contingency plan.

The emergency coordinator and his alternate are expected to be thoroughly familiar with all aspects of the PROTECO contingency plan, the facility layout, the characteristics of the wastes that are handled by the facility, the treatment, storage and disposal operations, and the location of all records kept by the facility. The emergency coordinator and alternate receive specialized training to ensure that they are familiar with

TABLE 10

GENERAL INFORMATION SUMMARY

Name of Facility:	Proteccion Tecnica Ecologicia, Incorporated
EPA I.D. Number.:	PRD091018622
Location:	Road 385 - Km 3.5 Tallaboa Penuelas, Puerto Rico
Mailing Address:	Firm Delivery Ponce, Puerto Rico 00731
Facility Telephone Number:	(809) 836-2058
Facility Owner:	Compania Ganadera del Sur, Inc.
President:	Jorge Fernandez
General Manager:	Ahindra K. Banerjee
Emergency Coodinators:	Enrique Negron Francisco Bartolomei
Type of Facility:	Hazardous waste treatment, storage and disposal facility
Facility Site Plan:	Appendix I
Description of On-Site Activities:	Pozzolanic immobilization Anaerobic digestion Neutralization/evaporation Storage of waste in containers Storage of waste in tanks

TABLE 11

DISPOSITION OF GENERAL CATEGORIES OF WASTE

Waste Classification	Estimated Annual Quantity	Storage		Neutralization	Stabilization/ Fixation
		Container	Tank		
Ignitable	230,000 Kilograms	X		X	X
Corrosive	2,000,000 Kilograms	X			X
EP Toxic - Metals	1,090,000 Kilograms	X			X
EP Toxic - Pesticides	290,000 Kilograms		X		X
Non-Specific Source Waste	225,000 Kilograms	X			X
Specific Source Waste	4,000 Kilograms	X		X	X
Acutely Hazardous Commercial Chemical Products	100 Kilograms	X			X
Other Commercial Chemical Products	52,000 Kilograms	X			X

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the above. The emergency coordinator's job responsibilities as defined in 40 CFR Section 265.55 and 264.56 are provided in Table 12.

At all times, there is at least one emergency coordinator either on the facility premises, at the Penuelas office or on call (i.e., available to respond to an emergency by reaching the facility within a short period of time). Table 13 lists the primary and alternate PROTECO emergency coordinators.

2.3 Implementation of the Contingency Plan

The contingency plan will be implemented if an incident occurs at the facility that might threaten human health or the environment. The contingency plan includes responses to threats both internal and external to the facility. Emergencies that might arise could be caused by acute events or by non-acute events. Non-acute emergencies are situations that can be readily controlled with on-site emergency equipment and by the emergency response personnel. This would include the discovery of a leaking drum or a small spill of hazardous waste. Acute emergencies are those incidents that are not readily controlled by emergency equipment and emergency response personnel. This would include the spill of an ignitable waste, a fire or an explosion.

In case of an emergency situation, the emergency coordinator has full authority to make the decision to implement the contingency plan. Depending on the degree of seriousness, the following potential emergencies might call for the implementation of the contingency plan at the facility:

Spills

- The spill could result in release of flammable liquids or vapors creating a fire or gas explosion hazard.
- The spill could cause the release of toxic liquids or fumes.
- The spill can be contained on-site but the potential exists for groundwater pollution due to aquifer contamination.

TABLE 12

EMERGENCY COORDINATOR RESPONSIBILITIES AS DEFINED IN 40 CFR, PART 264, SUBPART D

40 CFR 264.55 - Emergency Coordinator.

At all times, there must be at least one employee either on the facility premises or on call (i.e., available to respond to an emergency by reaching the facility within a short period of time) with the responsibility for coordinating all emergency response measures. This emergency coordinator must be thoroughly familiar with all aspects of the facility's contingency plan, all operations and activities at the facility, the location and characteristics of waste handled, the location of all records within the facility, and the facility layout. In addition, this person must have the authority to commit the resources needed to carry out the contingency plan.

(Comment: The emergency coordinator's responsibilities are more fully spelled out in Section 265.56. Applicable responsibilities for the emergency coordinator vary, depending on factors such as type and variety of waste(s) handled by the facility, and type and complexity of the facility.)

40 CFR 265.46 - Emergency Procedures.

(a) Whenever there is an imminent or actual emergency situation, the emergency coordinator (or his designee when the emergency coordinator is on call) must immediately:

(1) Activate internal facility alarms or communication systems, where applicable, to notify all facility personnel; and

(2) Notify appropriate State or local agencies with designated response roles if their help is needed.

(b) Whenever there is a release, fire, or explosion, the emergency coordinator must immediately identify the character, exact source, amount, and areal extent of any released materials. He may do this by observation or review of facility records or manifests and, if necessary, by chemical analysis.

(c) Concurrently, the emergency coordinator must assess possible hazards to human health or the environment that may result from the release, fire, or explosion. This assessment must consider both direct and indirect effects of the release, fire, or explosion (e.g., the effects of any toxic irritating or asphyxiating gases that are generated, or the effects of any hazardous surface water run-offs from water or chemical agents used to control fire and heat-induced explosions).

TABLE 12 (CONTINUED)

EMERGENCY COORDINATOR RESPONSIBILITIES
AS DEFINED IN 40 CFR, PART 264, SUBPART D

(d) If the emergency coordinator determines that the facility has had a release, fire, or explosion which could threaten human health, or the environment, outside the facility, he must report his findings as follows:

(1) If his assessment indicates that evacuation of local areas may be advisable, he must immediately notify appropriate local authorities. He must be available to help appropriate officials decide whether local areas should be evacuated; and

(2) He must immediately notify either the government official designated as the on-scene coordinator for that geographical area (in the applicable regional contingency plan under Part 1510 of this Title), or the National Response Center (using their 24-hour toll free number (800) 424-8802). The report must include:

(i) Name and telephone number of reporter;

(ii) Name and address of facility;

(iii) Time and type of incident(e.g., release, fire);

(iv) Name and quantity of material(s) involved, to the extent known;

(v) The extent of injuries, if any; and

(vi) The possible hazards to human health, or the environment, outside the facility.

(e) During an emergency, the emergency coordinator must take all reasonable measures necessary to ensure that fires, explosions, and releases do not occur, recur, or spread to other hazardous waste at the facility. These measures must include, where applicable, stopping processes and operations, collecting and containing released waste, and removing or isolating containers.

(f) If the facility stops operations in response to a fire, explosion or release, the emergency coordinator must monitor for leaks, pressure buildups, gas generation, or ruptures in valves, pipes, or other equipment, wherever this is appropriate.

(g) Immediately after an emergency, the emergency coordinator must provide for treating, storing, or disposing of recovered waste, contaminated soil or surface water, or any other material that results from a release, fire, explosion at the facility.

TABLE 12 (CONTINUED)

EMERGENCY COORDINATOR RESPONSIBILITIES
AS DEFINED IN 40 CFR, PART 264, SUBPART D

(Comment: Unless the owner or operator can demonstrate, in accordance with Section 261.3(c) or (d) of this Chapter, that the recovered material is not a hazardous waste, the owner or operator becomes a generator of hazardous waste and must manage it in accordance with all applicable requirements of Parts 262, 263, and265 of this Chapter.)

(h) The emergency coordinator must ensure that in the affected area(s) of the facility:

(1) No waste that may be incompatible with the released material is treated, stored, or disposed of until cleanup procedures are completed; and

(2) All emergency equipment listed in the contingency plan is cleaned and fit for its intended use before operations are resumed.

TABLE 13

EMERGENCY COORDINATORS FOR
PROTECCION TECNICA ECOLOGICA, INCORPORATED

Name	Title	Office Phone	Address	Home Phone
Raul Gaya Nigaglioni	Primary Emergency Coordinator	836-2058	103 Mallorca Floral Park Hata Rey, PR	754-7772
Victor Negron Vazquez	Alternate Emergency Coordinator	836-2058	Urb. Sta. Teresita Calle 4AX-18 Ponce, PR	840-2944
Juan Negron Rodriquez	Alternate Emergency Coordinator	836-2058	Quimico Bo Callores Carr 512 Juana Diaz, PR	836-1678
Francisco Bartolomei Leon	Alternate Emergency Coordinator	836-2058	Calle Central #23 Coto Laurel, PR	848-2176
Hector I. Zayas Ortiz	Alternate Emergency Coordinator	836-2058	Urb El Madrigal Calle 14 O-11 Ponce, PR	844-3401

- The spill cannot be contained on-site resulting in off-site soil contamination and/or ground or surface water pollution.
- A spill has occurred.

Fires

- The fire could cause the release of toxic fumes.
- If the fire spreads, it could ignite materials at other locations at the site or cause heat-induced explosions.
- The fire could spread to off-site areas.
- Use of water or water and chemical fire suppressant could result in contaminated run-off.
- A fire has occurred.

Explosions

- An imminent danger exists that an explosion could occur, resulting in a safety hazard due to flying fragments.
- An imminent danger exists that an explosion could ignite other hazardous waste at the facility.
- An imminent danger exists that an explosion could result in release of toxic material.
- An explosion has occurred.

As required by 40 CFR 264.196, the contingency plan is to be implemented if a leak and/or a spill from a tank holding the lindane waste occurs. Procedures to respond to tank spills or leakage, removal of the waste and repair of the tank are provided in Section 2.4.3.4. 40 CFR 264.227(d) requires the contingency plan to be implemented whenever a surface impoundment must be removed from service. Procedures for responding to this situation are also provided in Section 2.4.

2.4 Emergency Response Procedures

2.4.1 Notification

In the event of the discovery of an imminent or an actual emergency situation the employee, security guard, visitor or contractor discovering the situation must immediately contact the emergency coordinator or his alternate. Upon notification, the emergency coordinator will obtain as much of the following information as possible: brief description of the incident; exact location; time; accessibility; and hazardous waste(s) involved. After assessing the situation the emergency coordinator, using the radio-telephone and walkie-talkie to contact the facility personnel and the security guards, will provide instructions to operating personnel exposed to the danger and to the security guards so they can take the appropriate actions. Depending on the seriousness and the nature of the emergency (i.e., sudden or non-sudden) the emergency coordinator may contact outside organizations such as local police and fire departments, hospitals, and state and federal agencies to assist in rescue, firefighting, spill control and evacuation operations as needed. Table 14 lists the outside emergency contacts that may be contacted during an emergency.

If the facility has had a release, fire or explosion which could threaten human health or the environment, the emergency coordinator will notify the National Response Center at (800) 424-8802 and report the incident. The notification will include the following:

- Name and telephone number of the reporter
- Name and address of the facility
- Date, time and type of incident
- Identification of the source of characteristics and quantity of materials involved (e.g., 50 gallons of electroplating waste, drum storage area)
- The extent of injuries, if any
- An assessment of the possible hazards to the environment and human health outside the facility

TABLE 14

OUTSIDE EMERGENCY ASSISTANCE
EMERGENCY CONTACTS

Contact	Location	Telephone
Civil Defense	Penuelas	(809) 724-0214
Police Department	Penuelas	(809) 343-2020
Fire Department	Penuelas	(809) 343-2330
Hospital de Damas	Ponce	(809) 843-5151
Penuelas Medical Center	Penuelas	(809) 836-1651

REGULATORY AGENCIES

Contact	Location	Telephone
National Response Center	Washington, D.C.	(800) 424-8802
USEPA Region II	New Jersey	(201) 548-8730
Environmental Quality Board	San Juan	(809) 725-5140
USEPA - Puerto Rico Division	San Juan	(809) 724-7825

2.4.2 Identification and Assessment of the Emergency

During the initial phase of the emergency response, a number of key decisions must be made by the emergency coordinator regarding imminent or potential hazards and the need for the protective actions. The emergency coordinator will identify the location of the emergency, the waste's hazardous characteristics and the quantity of the waste released from the information provided during the notification phase of the incident. If for some reason the coordinator cannot identify the released material, a sample will be collected and analyzed by PROTECO for the general parameters described in the waste analysis plan (see Section 3).

From the information gathered the coordinator will make an initial assessment on whether the release fire or explosion is a sudden (acute) or non-sudden emergency. Whenever possible the coordinator will visually inspect the release and the location concurrently assessing possible health hazards to human health or the environment. This assessment will consider both direct and indirect effects of the release, fire or explosion.

2.4.3 Emergency Response Procedures

The emergency coordinator is required to take a series of actions upon the discovery of an emergency situation, during the emergency control phase and immediately following the attainment of control. In order to develop an effective containment/cleanup strategy, the emergency coordinator must take the following information into consideration:

- Physical state of spilled waste solid, liquid, sludges, slurries)
- Container characteristics
- Spill situation (storage, treatment, transportation)
- Potential fire or explosion hazards
- Area that is affected
- Environmental factors (e.g., weather conditions)
- Time of incident

The following subsections describe the initial response procedures that are taken by the facility during an emergency situation and the specific procedures that are use by emergency response personnel for the containment and cleanup of spills, fires or explosions.

2.4.3.1 Initial Response Procedures. Initial response procedures to be taken by the facility personnel and the emergency coordinator are described below. These procedures are to be used for every emergency situation.

1. Any employee, security guard, contractor or visitor discovering or causing an emergency situation spill, (leaking drum) must immediately contact one of the emergency coordinators

2. The employee, security guard, contractor or visitor will describe the emergency situation giving a brief description of the emergency, the exact location of the emergency, time of occurrence, accessibility to the emergency and the type and quantity of waste spilled, if possible.

3. By considering the nature of the emergency (i.e., leaking drum, spill or fire) the emergency coordinator will perform the following tasks:

   a. Assess the degree of hazard to operating personnel, emergency personnel and the surrounding area;
   b. Make and execute the decision to evacuate personnel from the affected area, when necessary;
   c. If the released waste cannot be identified, collect and analyze a representative sample;
   d. Make the decision to call outside organizations (Table 14) and/or the National Response Center;

e. Select the appropriate personnel protective equipment; and
f. Formulate the response operation plan.

4. When the emergency coordinator makes a decision to evacuate the facility, the alarm system will be activated. Upon hearing the alarm, all employees must leave their work areas and evacuate the premises, as described under evacuation procedures (Section 2.7).

5. The emergency coordinator will take all necessary measures to contain the hazard within the area of the facility and to prevent its spread to the environment and to the areas adjoining the facility boundaries.

6. Safety measures will be taken to ensure maximum protection of the safety and health of the emergency response personnel to include the use of appropriate personnel protective equipment. At a minimum, this personnel protective equipment will include the following:

   a. Disposable, chemical-resistant coveralls
   b. Chemical resistant gloves and boots
   c. Safety glasses or goggles
   d. Chemical-cartridge respirator
   e. Hard hats

7. All non-emergency response personnel will be moved from the hazard area and any established buffer zone areas until the emergency has been taken care of.

8. Upon the arrival of emergency response personnel and/or outside organizations the emergency coordinator will brief them regarding the potential or actual hazards, the location of the emergency, the containment procedures to be used and the appropriate personnel protective equipment.

2.4.3.2 Spill Response Procedures. The goal of the spill response is containment and cleanup of the spilled material without hazard to human health or the environment. Figure 10 provides a flow chart to be used by the emergency coordinator during emergencies involving spills and the following pages list the procedures to be followed by the emergency response personnel.

2.4.3.2.1 Containment and cleanup of liquids or slurries.

1. Dike ahead of the spill for containment of the liquid

2. Stop flow of the liquid at source by one of the following methods:

   a. plug hole in drum or tank using putty
   b. turn off valve/drain if applicable
   c. upright overturned container

3. In the case of a small spill (under 50 gallons) place the appropriate absorbent material on the spill. (Table 15 outlines the properties of the spill control materials used by PROTECO.)

4. In the case of a large spill (greater than 50 gallons), the emergency response personnel will build dikes with absorbent pads and will direct the flow to depressed areas for easy collection. When necessary, the liquid will be pumped into containers. Then the appropriate absorbent material will be placed on the spill.

5. If the released waste is an ignitable material, special precautions regarding flammability must be taken. No sparks, flames, arcs or heated items can be in area vapor.

6. Shovels and/or a bulldozer will be used for cleaning up the contaminated absorbent material and soil. All contaminated and discolored soil will be scraped up within 12 inches of the spill surface soil.

TABLE 15

SPILL CONTROL PROPERTIES OF ABSORBENT MATERIALS
USED AT PROTECCION TECNICA ECOLOGICA, INC.

Material	Usage	Bulk Density of Material (lbs/cubic ft.)	Gallon of Contaminant Attenuated Per Pound of Material (gallons)	Capacity for Absorption By Volume of Material (percent)	Bags of Material Required per 5 gal. Spill
Speedi-Dri	Absorption of non-chlorinated and chlorinated solvents, oils	30 - 40	0.11 - 0.13	50 - 60	1 1/2*
Vermiculite	Absorption of acid or alkaline waste spills, aqueous materials, oils	30 - 40	0.11 - 0.13	50 - 60	1 1/2*
Cement Kiln Dust	Absorption of EP Toxic solutions and sludges, waste lindance solution and other toxic materials	100	0.08 - 0.11	40 - 50	N/A

* Calculation assumes a 50 percent excess quantity of adsorbent material over the theoretical amount required to adsorb a 5 gallon spill.

7. All contaminated absorbent material and soil will be considered a hazardous waste unless waste analyses of the contaminated absorbent or soil shows otherwise.

8. All contaminated materials and soil will be placed in 55 gallon drums compatible with the contaminants and the drums will be marked with the appropriate DOT labels and markings.

9. Decontaminate all reusable equipment and put disposable equipment into one of the spill cleanup containers.

10. These materials (contaminated absorbent, soil, disposable equipment and the water used to decontaminate the equipment) generated by the emergency response personnel will be treated and disposed of at the PROTECO facility.

11. The emergency coordinator will ensure that all emergency equipment is restored to full operational status by the emergency response personnel. Table 16 provides a checklist to be completed by the emergency coordinator after each incident.

12. The emergency coordinator will investigate the cause of the emergency and will take steps to prevent the recurrence of such an incident.

13. The emergency coordinator will notify the EPA, EQB and local agencies where applicable.

14. If necessary, the emergency coordination will submit a written report of the incident to the Administrator of EPA Region II.

2.4.3.2.2 Containment and Cleanup of Sludges and Solids

1. Stem the flow to prevent further spills by using plugs, patches, reinforcing the container or uprighting the container.

2. If it is extremely windy and the waste is dry and grandular, cover the spilled waste with plastic sheeting to prevent dispersion. Fold back the cover to expose only the waste to be shoveled.

3. Using a shovel to clean up the spilled waste and the contaminated soil, place into containers compatible with the released material.

4. Mark and label any containers used to hold spilled and contaminated materials according to applicable DOT regulations.

5. If the spill occurred due to a damaged container, enclose the container in an overpack or transfer the contents of the container to a new drum. Label and mark drum as required by DOT.

6. Decontaminate all reusable equipment and put disposable equipment into one of the spill cleanup containers.

7. The emergency coordinator will ensure that all emergency equipment is restored to full operational status by the emergency response personnel. Table 17 provides a checklist to be completed by the emergency coordinator after each incident.

8. The emergency coordinator will investigate the cause of the emergency and will take steps to prevent the recurrence of such an incident.

9. The emergency coordinator will notify the EPA, EQB and local agencies where applicable.

10. If necessary, the emergency coordination will submit a written report of the incident to the Administrator of EPA Region II.

2.4.3.3 Fire and/or Explosion Response Procedures. The following provides the procedures to be followed if a spill of a volatile ignitable waste, a fire and/or an explosion occurs.

TABLE 17

PROTECCION TECNICA ECOLOGICA, INC.
EMERGENCY EQUIPMENT CHECKLIST

Per 40 CFR, Part 264.56(h)(2) the following emergency equipment must be cleaned and fit for its intended use before operation of the facility is resumed.

Item	No.	Functional	Non-Functional	Corrected
Equipment				
Absorbent pads	____	____	____	____
		____	____	____
	____	____	____	____
Fire Extinguishers	____	____	____	____
	____	____	____	____
	____	____	____	____
Shovels	____	____	____	____
	____	____	____	____
	____	____	____	____
	____	____	____	____
Pumps	____	____	____	____
	____	____	____	____
	____	____	____	____
	____	____	____	____
Front-end Loader	____	____	____	____
	____	____	____	____
	____	____	____	____
	____	____	____	____
Vacuum truck	____	____	____	____
	____	____	____	____
	____	____	____	____
	____	____	____	____
Radio-telephone	____	____	____	____
	____	____	____	____
	____	____	____	____
	____	____	____	____
Walkie-talkies	____	____	____	____
	____	____	____	____
	____	____	____	____

1. The emergency coordinator will determine if a fire or explosion hazard exists or has occurred from the information provided during the notification.

2. The emergency coordinator will notify the Penuelas Fire Department (343-2330) and the local civil defense department (724-0124). (The facility can be accessed by the fire fighting vehicles and related equipment from these organizations).

3. If a fire should break out, emphasis will be placed on preventing the fire from spreading to nearby areas and to other sections of the facility where ignitable wastes are handled by providing trenches as fire barriers.

4. All ignition sources within the area will be immediately eliminated including flames, sparks, arcs or heated items.

5. The emergency coordinator will take measures to ensure maximum protection for the safety and health of emergency response personnel, outside assistance areas surrounding the facility.

6. The emergency coordinator will have the emergency response personnel activate the facility fire fighting system.

7. After the ignitable vapors have been dispersed and the fire eliminated, shovels and/or bulldozers will be used to clean the hazard area and to scrape up contaminated soil. All waste generated from the containment and cleanup will be considered hazardous waste.

8. Following containment and control of the emergency, the emergency coordinator will provide for the collection, treatment and/or disposal of the wastes, contaminated soil, water or other materials generated from the cleanup of the emergency situation.

9. The emergency coordination will ensure decontamination of all reusable equipment and put disposable equipment into one of the spill cleanup containers. These containers will be labeled and marked as required by DOT.

10. The emergency coordinator will ensure that all emergency equipment is restored to full operational status by the emergency response personnel. Table 17 provides a checklist to be completed by the emergency coordinator after each incident.

11. The emergency coordinator will investigate the cause of the emergency and will take steps to prevent the recurrence of such an incident.

12. If necessary, the emergency coordination will submit a written report of the incident to the Administrator of EPA Region II.

13. The emergency coordinator will notify the EPA, EQB and local agencies where applicable.

2.4.3.4 Leak or Spills from Tanks. In the event of a leak or spill from any tanks, all hoses, hatches and drains will be checked and closed if open. If the waste spill is not contained within a dike or sump area, an area of isolation will be established around the release. The size of the area will generally depend on the size of the spill and the waste involved. If the spill is large and involves a tank rupture, an initial isolation of at least 100 feet in all directions will be used. Small spills or leaks from the tanks or hose will require evacuation of at least 50 feet in all directions to allow cleanup and repair. When any spill occurs, only emergency response personnel will be allowed into the designated hazard area as directed by the emergency coordinator. As soon as possible, the area will be roped or otherwise blocked off. Containment and cleanup will use the procedures described in Sections 2.4.3.2.

2.4.3.5 Emergency Response for Surface Impoundments. The surface impoundments will be inspected weekly and after every storm to determine if a sudden drop of the level of liquids has occurred or if leaks have developed in the dikes. If either of these situations are observed during an inspection, the inspector will immediately notify the emergency coordinator. The emergency coordinator will have the facility stop the addition of any streams to the surface impoundment and will authorize any surface leakage that has occurred or is occurring to be isolated. The size of the isolation area will depend on the size of the leak and the waste type involved.

For small spills the appropriate absorbent material (see Table 15) will be added to absorb free liquid. For larger spills, the liquid will be pumped into approved DOT containers. All the waste and cleanup materials shall be considered hazardous waste and will be treated and disposed of by the facility.

If a leak cannot be stopped by any other means, the surface impoundment will be pumped into the Aqueous Waste tank after the proper waste movement testing.

2.4.4 Prevention of Recurrence

Action will be taken by the emergency coordinator to prevent the spread of fires, explosions or releases during the emergency including stopping facility operations till the incident is over, collecting and containing released waste, and/or recovering or isolating containers. After the incident, the emergency coordinator will prevent the recurrence by determining how the incident occurred using the following methods:

- Inspect the area where the incident occurred;
- Interview personnel who were in the area when the incident occurred,
- Inspect and monitor equipment/containers for signs of deterioration or leakage;

- Prepare a summary of the findings and make recommendations to the facility manager, and
- Implement recommendations.

2.5 Emergency Equipment

All PROTECO vehicles that enter the facility are provided with radio-telephone communication systems so that personnel can contact the office and hence the emergency coordinator in case of an emergency situation. Security guards are provided with walkie-talkies to facilitate internal communications during an emergency. The telephone numbers of the primary and alternate emergency coordinators and emergency numbers for outside assistance are located in the guard shack and at the receptionist desk in the Penuelas office.

The following section describes the available equipment that can be used in an emergency.

2.5.1 Internal Communications

2.5.1.1 Existing Internal Communications. Existing internal communications rely on truck, heavy equipment and vehicle horns to sound an alarm in the active portions of the facility.

2.5.1.2 Proposed Internal Communications. In addition to the existing emergency warning system the proposed new facilities will incorporate self-contained compressed-gas-powered truck horns at fixed stations at the proposed facilities. These horns are non-electrical and contain enough bottled gas to sustain a 20 to 30 minute warning. A warning system station will be included at the stabilization/fixation unit at each new landfill unit at the new drum storage facility, and at the proposed tank farm.

2.5.2 External Communications

PROTECO is equipped with the following equipment to provide external communications availability and access at the facilities:

- A radio-telephone system installed in all facility trucks which provide communication from the active portions of the facility to the Penuelas office
- Walkie-talkies for security guards
- A telephone located at the office which may be used to summon assistance from local police and emergency teams.

2.5.3 Emergency Equipment

A list of available emergency equipment for the containment and clean-up of spilled hazardous waste is provided in Table 18. As indicated, absorbent materials are stored in a number of areas. The standard absorbents are strategically located throughout the facility to facilitate rapid response effort. Procedures to be taken to ensure decontamination of this equipment and a checklist used by the emergency coordinator to determine equipment functionability is provided in Table 17. In addition, all spill control, safety and fire control equipment is inspected monthly and a log of the inspection is kept for three years.

2.5.4 Safety Equipment

Protective clothing and equipment is utilized to protect employees during normal and emergency operations. Safety glasses and steel-toed boots or shoes constitute the minimum clothing requirements. The shop area warehouse and storage closet at the Penuelas office are the predominant storage locations for the protective equipment and includes the following:

disposable chemical-resistant coveralls
rubber/Neoprene boots
rubber/Neoprene gloves

TABLE 18

EMERGENCY EQUIPMENT FOR SPILL CONTAINMENT AND CLEANUP

Material/Equipment*	Absorbed/Cleaned up	Notes
Vermiculite	For small spills of oil, acids or caustics, aqueous materials	Keep in 55-gallon 17-E containers when stored outside.
Speedi-dry	For small spills of oil, chlorinated/non-chlorinated solvents, aqueous materials	Keep in 55-gallon 17-E containers stored outside.
Cement kiln dust	For spills of sludges, solids, toxic materials, lindane waste	Available only during immobilization.
Soda ash	For spills of waste lindane solution	Use to neutralize the waste lindane
Caliche	To build dikes and for preventing run-off controls	For large spills
Absorbent pads	Most organics. Do not use for acids.	Place around equipment where leakage or spillage frequently occurs.
55-Gallon drums; Steel, polyethylene	Organics, contaminated absorbent materials (steel); acids, caustics contaminated absorbent materials (polyethylene)	For storage of waste, contaminated equipment, and soil till treatment at the facility occurs.

*See Facility Site Plan for listed areas

TABLE 18 (CONTINUED)

EMERGENCY EQUIPMENT FOR SPILL CONTAINMENT AND CLEANUP

Material/Equipment*	Absorbed/Cleaned up	Notes
Shovels, pumps	Excavation, spill clean-up	For small spills.
Vacuum truck	Spill clean-up	For large spills.
Pick-up trucks	Spill clean-up	For large spills.
Ford Bronco	Transportation of personnel and equipment	
Front-end loader	Excavation, spill clean-up, building emergency dikes	
Dump trucks	Debris removal, material delivery.	

*See Facility Site Plan for listed areas

chemical cartridge respirators
full face masks
non-toxic particle masks

2.6 Coordination Agreements

A copy of the original contingency plan has been maintained at the Penuelas office. A copy of the new contingency plan as provided herein and all subsequent revisions are maintained at the Penuelas office and has been submitted to all of the agencies listed below.

Municipal Government of Puerto Rico

Office of Civil Defense
P.O. Box 38
Penuelas, Puerto Rico

Department of Health
Penuelas Medical Center
Penuelas, Puerto Rico

Department of Fire
Penuelas, Puerto Rico

Department of Police
Penuelas, Puerto Rico

Hospital de Damas
Highway 2
Ponce, Puerto Rico

Environmental Quality Board
P.O. Box 11488
San Juan, Puerto Rico

2.7 Evacuation Plan

In the event that a hazardous waste incident would present an imminent threat to personnel health, life or safety, the emergency coordinator will initiate the following evacuation procedures, by contacting the facility personnel and/or security guards on the radio-telephone. Only the emergency coordinator can initiate facility evacuation.

1. The emergency coordinator has assessed the situation and deems it necessary to evacuate the facility. He will contact the facility personnel and/or security guards on the radio-telephone.

2. The security guards will proceed to the facility access gates. No further entry of personnel, visitors, contractors or trucks will be permitted.

3. Supervisors will designate the safest access routes for his employees to take and will also choose an alternate route in case the first choice is inaccessible.

4. The supervisors will use the truck horns to sound the emergency signal. The signal will be two short blasts and one long blast. This signal will be repeated five times.

5. All personnel, visitors and contractors will exit through the access gate. All employees will be accounted for by their supervisors.

6. No personnel shall remain or re-enter the facility unless specifically authorized. Those allowed to enter the facility will normally include emergency coordinator, emergency response personnel and any outside assistance groups contacted.

7. Re-Entry into the affected area will occur only after proper clearance is given. Situations which would warrant partial or complete evacuation of the facility would include:

- Spills or chemical reactions resulting in highly toxic fumes;
- Fire, when it cannot be contained and is spreading to other parts of the facility;
- Fire that could generate highly toxic fume, or an explosion.

Evacuation drills will be held biannually to practice the implementation of all the above procedures and are to be treated with the same seriousness as an actual emergency. If new roads are built, these routes will be revised. The emergency coordinator will revise the evacuation procedures when the drills or actual implementation show that new procedures are needed.

2.8 Required Reports

The PROTECO facility manager must notify the EPA Region II Administrator, the Puerto Rico Environmental Quality Board and local authorities that the facility is in compliance with Section 265.56(h) of the Federal Regulations before operations at the facility are resumed in the areas affected by the emergency.

Within 15 days after an incident requiring implementation of the contingency plan, the facility manager or emergency coordinator must submit a written report on the incident to the EPA Region II Administrator and the Puerto Rico Environmental Quality Board. A copy of the report form is provided in Figure 12. The report must include the following information:

1. Name, address and telephone number of the owner or operator.

2. Name, address and telephone number of the facility.

3. Date, time and type of incident.

4. Name and quantity of materials involved.

FIGURE 12

REPORTING FORM FOR EMERGENCY EVENT

Name of Facility: ____________________

Address of Facility: ____________________

____
(City) (State) (Zip Code)

Telephone Number: ____________________

Name and Address of Operator:

____
(Name)

____
(Street)

____
(City) (State) (Zip Code)

Date: ____________________ Time: ____________________

Type of Incident: ____________________

Name and Quantity of Materials Involved: ____________________

____

Extent of Injuries: ____________________

____

Assessment of Hazards: ____________________

____

Estimated Quantity and Disposition of Material from the Incident: ____________________

____

5. The extent of injuries, if any.

6. An assessment of actual or potential hazards to human health or the environment where this is applicable.

7. Estimated quantity and disposition of recovered material that resulted from the incident.

The emergency coordinator will also note in the operating record the time, date and details of any incident that requires implementation of the contingency plan.

2.9 Amendments

The contingency plan will be reviewed and revised or amended by the PROTECO emergency coordinators whenever:

- The facility Part B permit is revised
- In accordance with the experience acquired during each emergency situation
- The plan fails during an emergency situation
- The list of emergency coordinator changes
- The list of emergency equipment changes
- Changes in design, construction or operation increases the potential for released, fires or explosions.

HAZARDOUS WASTE ORIENTATION MEETING OUTLINE

I. Introduction

A. Welcome participants

B. Introduce orientation program

C. Explain reasons for this training

1. Familiarization with facility's hazardous waste management program.
2. Inform participants of their responsiblities.
3. Prepare participants to respond effectively to emergencies.

II. General Discussion of RCRA Regulations

A. Review the criteria of hazardous waste

1. Toxic - poisonous
2. Ignitable - fire hazard
3. Reactive - explosive
4. Corrosive - high acid or alkaline - can eat through containers

B. Explain the fole of this facility

1. Generating facility - produces hazardous waste - explain that these wastes are not limited to production processes. Hazardous waste can be a bi-product of a maintenance activity or can be a discovery in a warehouse or distribution center.
2. Storage facility - holds hazardous waste.
3. Treatment facility - processes hazardous waste to make it less or non-hazardous.
4. Disposal facility - intentionally placing hazardous waste into or on land or water.

C. List and describe the specific hazardous wastes managed in this facility

D. Answer questions

III. Specific Discussion of RCRA Regulation

A. Identification of hazardous waste

1. Exhibits any of the following characteristics: (See 40 CFR Part 261 sub-part C)

a. Ignitable
b. Corrosive
c. Reactive
d. Toxic

2. The waste has been found to be fatal to human (40 CFR Part 261.11(a)(2))

3. The waste is listed or constituents of the waste is lited in Appendix VIII of 40 CFR Part 261.

4. Explain any additional state requirements.

B. Packaging hazardous waste prior to shipping - requirements contained in 49 CFR Part 178. Explain any state requirements

C. Labeling, marking, and placarding requirements contained in 49 CRF Part 172. Explain any state requirements

D. Manifesting

1. Show and explain specific manifest form(s) to be used at this facility. Discuss all information that must be entered and where that information is found.

2. Review the number of copies to be made out.

a. Generator - 2 copies
b. Each transporter - 1 copy
c. Facility hazardous waste is being shipped - 2 copies
d. State - 1 copy from generator
e. State - 1 copy fro TSD facility

3. Explain generator's actions if manifest is not received back within 35 days.

4. Explain generator's actions if manifest is not received back within 45 days.

5. Explain TSD actions if unmanifested waste is received.

E. Review briefly the requirements of a Transporter

IV. Facility Contingency Plan.

A. Explain actions of facility personnel when there is a:

1. fire
2. explosion
3. groundwater contamination
4. shutdown of operations
5. release of hazardous waste

B. Explain how plan will be implemented

C. Describe arrangements agreed to with:

1. police
2. fire department
3. hospitals
4. contractors
5. state and local emergency response teams

D. List all emergency equipment (where applicable)

1. fire extinguisher equipment
2. spill control equipment - explain what these are
3. communication and alarm systems - explain that these are
4. decontamination equipment - explain what these are

E. Describe evacuation procedure

1. under what conditions to evacuate
2. signal to begin evacuation
3. evacuation routes
4. alternate routes

F. Designate emergency coordinators

1. who are they
2. recap major responsibilities

H. Identify the emergency and monitoring equipment/systems used in the facility and explain how they operate. Include, where applicable:

1. Internal communication or alarm systems to provide immediate emergency instruction to personnel.
2. Telephone or radio communication to summon assistance from off-site.
3. Portable fire extinguishers and fire control equipment.
4. Spill control equipment.
5. Decontamination equipment.
6. Water at adequate volume and pressure
7. Automatic waste feed cut-off system
   a. discuss parameters for cut-off
8. Safety equipment
9. Security devices

I. For the equipment/systems utilized explain that there are procedures for:

1. Using
2. Inspecting
3. Repairing
4. Replacing
5. Explain where these procedures are found

J. Answer questions

PROTECCION TECNICA ECOLOGICA, INC. (PROTECO)

ORGANIGRAMA

Jorge Fernández Pabón
PRESIDENTE

Raúl Gayá
(DIRECTOR TECNICO)

Darlene G. de Báez
(Gerente)

Ana María Rolón
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Labores

Felipe Vega
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Oscar Torres

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Humberto Vega
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SECTION I - CLOSURE AND POST-CLOSURE PLANS

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SECTION I

CLOSURE PLAN

I-1 General Closure Plan

Written plans and procedures for the closure of hazardous waste management facilities are required by regulations promulgated by the Environmental Protection Agency (EPA). As such, the closure and post-closure plans for the PROTECO site are hereby submitted in accordance with the requirements of 40 CFR Part 264.112 through 118, 264.178, 264.197, 264.288, Part 264.310, Part 264.351, Part 270.14(B)(13), (14), (15), (16), (17) and (18), as well as specific requirements contained in the Commonwealth of Puerto Rico Environmental Quality Board Rule 805. In addition, written cost estimates for closing the facility in accordance with the regulations and a written estimate of the annual cost of post-closure care are submitted herein.

Section I-1 of this document describes the various waste processing, treatment and disposal units and presents the method by which PROTECO intends to close the facility, following the scenario described in Section I-1a.

Provisions for post-closure care are presented in Section I-2, followed by the cost summaries for closure and post-closure care in Sections I-4 and I-6. Detailed cost estimates for closure and post-closure of waste management units are provided.

Section I-3 provides the required Notice in Deed and Notice to Local Land Authority. Section I-5 provides the financial assurance mechanism for closure, and Section I-7 provides this assurance for post-closure care. Liability insurance is addressed in Section I-8.

Existing regulated units which were previously covered in this Part B Application section have been removed and form the basis of an existing unit closure plan to be submitted to the Agency at a later date under separate cover. The existing units are not a part of the Part B permit application, but will be closed according to applicable regulations affecting the closure of each unit.

I-1a Closure Performance Standard

In accordance with 40 CFR Part 264.111, the closure plan is designed to ensure that the facility will not require further maintenance and controls, will minimize or eliminate threats to human health and the environment, and will prevent the escape of hazardous wastes or hazardous waste constituents, leachate, contaminated rainfall or waste decomposition products to the ground, surface waters or to the atmosphere.

PROTECO will achieve this standard of closure by the removal of all unprocessed hazardous wastes and hazardous waste residues, by decontamination and removal of all process and associated equipment except buildings and salvageable equipment which will be decontaminated and left in place, and by regrading all hazardous waste process areas subsequent to closure. these areas will be covered with clean fill and vegetated following the completion of all other closure activities.

The following sections discuss in detail the procedures and actions that will be taken in order to satisfy the closure performance standard.

During the site's operational lifetime, conditions or operations may be modified such that the Closure and Post-Closure Plans will require changes. The General Manager, or his designate, will be responsible for maintaining and updating the plans both prior to and after closure of the site. The General Manager may be contacted at the following address and phone number:

PROTECO, Inc.
Firm Delivery
Ponce, PR 00731
(809) 836-2058

A copy of the approved closure plan (and all the revisions to the plan) will be maintained at the PROTECO facility until the certification of closure completeness has been submitted and accepted by EPA Region II. The Region II Administrator will be notified at least 180 days prior to the date final closure is initiated. Upon completion of closure, a certification prepared by an independent Professional Engineer registered in the Commonwealth of Puerto Rico, stating that the facility has been closed in accordance with the specifications in the approved closure plan, will be submitted to the Region II Administrator.

A copy of the approved post-closure plan (and all revisions to the plan) will be kept at the Facility until the post-closure period begins. PROTECO will submit this post-closure plan for approval at least 180 days prior to the commencement of closure.

The closure documents for this RCRA Part B Permit Application were prepared using the cost of closing all hazardous waste operational areas by a third party in the event of sudden and total abandonment of the disposal site by the operator. The applicable basic assumptions for closure as recommended are:

- The maximum volume of untreated or other hazardous wastes remaining on-site will be treated and/or disposed of on-site.
- All waste storage tanks and associated piping, valves, and control devices will be cleaned, disassembled and landfilled on-site, unless it is economically feasible to salvage them, in which case they will be cleaned (and in which case, the plan and cost estimate will be modified).
- The Stabilization/Fixation Facility including associated equipment, piping, pumps, valves and control devices, will be cleaned, disassembled and landfilled on-site.

- All building structures will be left in place. They will be decontaminated after the removal and disposition of wastes, as described above.

- Fifty percent of all transportation equipment (e.g., trucks, trailers, roll-off containers), all heavy equipment (e.g., scrapers, front-end loaders, bulldozers, back hoes) and all other mobile equipment (e.g., fire trucks, pickup trucks, maintenance trucks, portable generators and air compressors) will be assumed inoperable and will be removed, cleaned and scrapped, if possible. If the equipment cannot be scrapped, it will be landfilled on-site. The remaining fifty percent of equipment, assumed to be still operable, will be cleaned and moved for use at another site.

- All supplies and non-waste handling equipment will be salvaged.

- The main road and parking areas serving the process area of the facility will be thoroughly swept and the sweepings will be landfilled on-site.

- The perimeter fence, gates and signs will be repaired, if necessary, and left in place.

- Except for the building structures, main road and parking area, which will be left in place, the site will be left with an appearance that conforms to the natural setting of the surrounding area.

- All buildings and equipment to be decontaminated will be cleaned by thorough washing with a high-pressure stream of water, followed by steam cleaning. In some instances, detergents or solvents may be added as necessary to enhance decontamination. Rented mobile equipment will be cleaned and decontaminated prior to being returned to owner.

- Once all process equipment has been removed, the concrete surface in the process areas will be decontaminated with high-pressure water, followed by steam.

- Decontamination will be deemed complete after rinseate sampling and analysis confirm that hazardous constituents are no longer present at hazardous levels.

- All contaminated stormwater in storage areas will be removed by vacuum truck and processed in the on-site Stabilization Fixation Facility.

- Landfills and the leachate treatment/storage facility are the only repositories that will contain hazardous wastes during the post-closure period.

- As required by 40 CFR 264.113(b)(2), PROTECO will take all necessary steps to prevent the occurrence of threats to human health and the environment from the unclosed but inactive facility.

I-1b Partial and Final Closure Activities

Closure plans for the above-grade landfill site and the process facilities are presented in the subsequent sections of this application. The aggregate closure schedule for all proposed facilities is given in Section I-1f. Total estimated time for closing the entire facility, based on on-site disposal, is 180 days.

All hazardous wastes and residues removed during partial closure will be disposed on-site when possible. Those wastes which can not be stabilized will be trans-shipped to the mainland for incineration. PROTECO will notify the EPA at least 180 days prior to initiating any final closure activities. Expected initiation of closure will be within 30 days after the final volume of waste is expected to be received.

I-1c Maximum Waste Inventory

For the purposes of this closure plan, proposed facilities at PROTECO will be assumed to contain the maximum volume of wastes indicated in Table I-1 at the time of closure.

I-1d Inventory Removal, Disposal or Decontamination of Equipment

All buildings and equipment to be decontaminated will be cleaned by thorough washing with a high pressure stream of water, followed by steam cleaning. Detergents or other cleaning additives may be added to the water, as necessary, to enhance decontamination. Washwaters determined to be hazardous by laboratory analysis will be collected by vacuum truck and treated on-site in the Stabilization/Fixation Facility which will be closed just prior to the final landfill section. A proposed sequence of unit closures is presented in Table I-2.

Outside contractors working on-site will provide their own personnel protective gear. All PROTECO personnel involved in the decontamination of the process facilities will be provided with protective equipment. PROTECO personnel will be equipped with acid/solvent resistant splash suits and hoods, steel-toe rubber boots, rubber gloves and self-contained breathing apparatus with full-face respirators. In addition, wrists and ankles will be taped to protect against splashes. The self-contained respirators will be used primarily for initial entry and decontamination of enclosures such as tanks. However, other types of respirators used in conjunction with hard hats and splash shields may be used in later phases of decontamination or for decontamination of more ventilated facilities or outside equipment. The respirators will have appropriate filter cartridges that seal directly to the mask.

Facilities will also be provided for personnel decontamination at the completion of each work interval.

Closure of the various waste storage, process and treatment units other than landfills includes the following common procedures:

TABLE I-1

MAXIMUM WASTE INVENTORY AT PROPOSED FACILITIES

FACILITY	METHOD OF CONTAINMENT	QUANTITY (ESTIMATED)	MAXIMUM INVENTORY	WASTE CATEGORY
Container	55 gal Drums	1025	56,375 gallons	Hazardous Waste/ Various Categories
Tank Farm	Tanks 1	1	15,000 gallons	Caustic
	Tanks 2	1	30,000 gallons	Acid
	Tanks 3	1	10,000 gallons	Neutralization liquids
	Tanks 4	1	10,000 gallons	Solvents
	Tanks 5	1	10,000 gallons	Solvents
	Tanks 6	1	30,000 gallons	Oil Sludge
	Tanks 7	1	15,000 gallons	Aqueous Waste
	Tanks 8	1	30,000 gallons	Oils
Stabilization/ Fixation	Tanks	2	4,000 gallons	Hazardous Waste/ Various Categories
	Sump	1	1,000 gallons	Hazardous Waste/ Various Categories
	Silo	1	21,100 gallons	Fly Ash
	Solids/Sludge		20 cy	Solid Hazardous Waste
Stormwater Retention Basin		1	10,000 gallon	Hazardous Waste/ Various Categories
Landfills I & II			100,000 cu. yds.(1)	Hazardous Wastes/ Various Categories
Leachate Ponds A & B			120,000 gallons	Hazardous Wastes/ Various Categories

NOTES: (1) Value is maximum volume for both landfills. Volume does not effect closure cost estimates.
(2) Decant Facility does not have any storage volume.

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TABLE I-2

PROPOSED SEQUENCE OF UNIT CLOSURES

Unit	Unit to Receive Waste
1. Container Storage Building	Container Decant Facility, Tank Farm, Stabilization/Fixation Facility On-Site landfill
2. Decant Facilities	Tank Farm, Stabilization/Fixation Facility On-Site Landfill
3. Bulk Storage Tanks	Stabilization/Fixation Facility On-Site Landfill
4. Stormwater Retention Basin	Stabilization/Fixation Facility On-Site Landfill
5. Stabilization/Fixation Facility	On-site Landfill
6. Secure Landfill	In-situ disposal
7. Leachate Ponds A & B(1)	Closure of 1 Unit as Disposal Impoundment

Note: 1. Leachate Ponds A & B will continue to operate during the Post-Closure Period. See Section I-d(4) for closure plans.
2. Materials which can not be stabilized will be transported to the mainland for incineration.

- Discontinue receiving hazardous waste
- Identify, classify and remove inventory
- Prepare inventory for on or off-site disposal
- Decontaminate equipment and structures
- Test for contamination
- Remove and dispose of appurtenances such as wiring, piping, valves, etc.
- Decontaminate equipment used for closure
- Proper stabilization/fixation and disposal of decontamination fluids and/or contaminated soils on-site.

In the following sections, specific detailed closure procedures are described for each of the waste management units or operations at PROTECO. These closure procedures have been developed so as to provide a detailed instructional document which will ensure the proper implementation of this plan.

I-1d(1) <u>Closure of Container Storage Facility</u>.

I-1d(1)(a) General Closure. Closure of the container storage facility will follow the general closure procedures outlined in Section I-1d. The schedule for the closure of these areas is given in Figure I-1.

I-1d(1)(b) Closure Procedures. Upon the delivery of the last containers of waste to the handling area, an inspection and inventory of each section of the area will be performed. The inspection will be performed to: (1) verify that actual inventory is consistent with the records of reported waste quantities, (2) confirm the integrity of all containers in preparation for inventory removal, and (3) identify spills, leaks, or cracks in the containment areas.

If spills, leaks or ponded liquids are discovered, appropriate materials will be used to contain and remove liquids using procedures described in the Contingency Plan, Section G-4C. If the source of the liquid is easily identified, the material will be swept up and placed in properly-labeled 55-gallon drums. Unidentified liquids will be sampled

FIGURE I-1

CLOSURE SCHEDULE

DAY

I. Container Storage Building and Decant Facility

1. Receipt of wastes stopped
2. Removal of drums
3. Area decontamination
4. On-site disposal of facilities and equipment
5. Certification

II. Tank Farm

1. Receipt of wastes stopped
2. Removal of wastes
3. On-site disposal of facilities equipment
4. Tank decontamination
5. Area decontamination
6. Final landscaping
7. Certification

III. Stormwater Retention Basin

1. Receipt of Wastes Stopped
2. Removal of Wastes
3. On-site disposal of facilities and equipment
4. Final landscapping
5. Certification

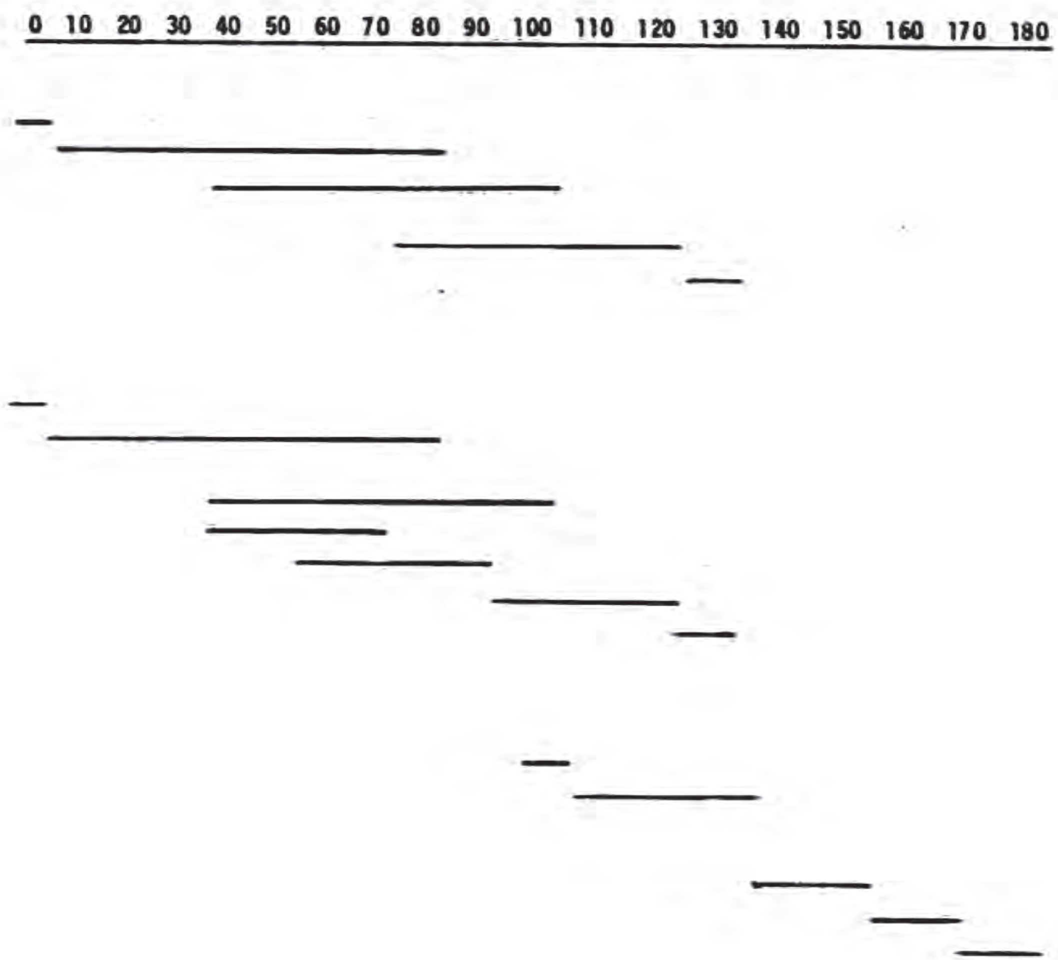


FIGURE I-1 (Continued)

CLOSURE SCHEDULE

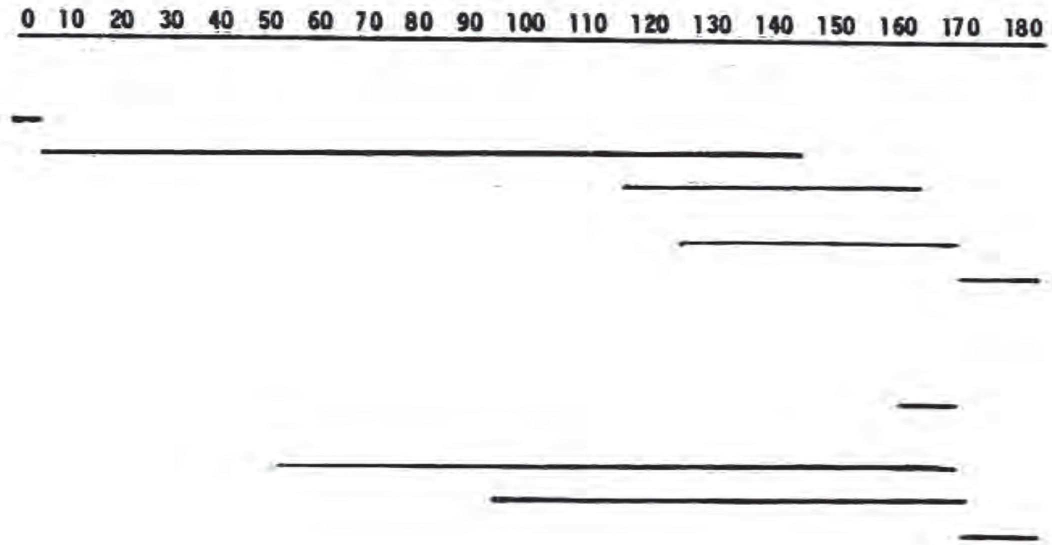
DAY

IV. Stalization/Fixation Facility

1. Receipt of wastes stopped
2. Final wastes stabilized
3. Area decontamination
4. On-site disposal of facilities and equipment
5. Certification

V. Secure Landfill

1. Receipt of wastes stopped
2. Fill and cover segment installed
3. Final landscaping
4. Certification



NOTE: Schedule is based on final closure in normal sequence and assumes adequate equipment, manpower and materials availability. Also assumed are no delays due to adverse weather conditions.

and characterized according to the Waste Analysis Plan, Section C-2. The Lab manager will make the decision concerning analytical parameters. After the liquid is identified, similar procedures will be followed to cleanup and remove the liquid. Liquids and solids obtained in this manner will be processed in the Stabilization/Fixation Facility. The final waste inventory will be removed according to the unloading operations described in Section F, Procedures to Prevent Hazards.

For the purposes of this closure plan, it is assumed that a maximum of 1/3 of the expected inventory of 1,025 drums of containerized wastes will not be able to be stabilized in on-site facilities and will require shipment at closure. Disposal will occur by the normal facility operating procedures described in Section F, Procedures to Prevent Hazards with PROTECO personnel transporting the drummed wastes from the storage area to the certified hazardous waste transporters trucks, where it will be verified that all containers are properly labeled and manifested. PROTECO will obtain the appropriate regulatory approvals for these wastes to be transported to the mainland for certified disposal.

The inspection and inventory will also include an inventory of empty drums. This will encompass the entire facility and will ensure that no empty drums or drums containing residual contaminants will remain on-site without plans approved ultimate disposal. Any drum containing residues will be triple rinsed with rinsewaters being consolidated into batch tanks or 55-gallon drums for processing in the Stabilization/Fixation Facility. An estimated 500 gallons of rinsewater is anticipated. Drums stored at the facility which previously contained hazardous waste and are considered empty, but contain more than one inch of solid residue, will be collected and stored at the storage area. The residues will be consolidated and processed through the Stabilization/Fixation Facility. Empty drums will be triple rinsed as described above. Empty, decontaminated drums will be crushed prior to authorized disposal.

After the final waste inventory and empty containers have been processed, decontamination of the facility can commence. Decontamination of the area will consist of a thorough washdown of the concrete floors and curbs with a mild detergent, which may contain surfactants or other additives to enhance decontamination. All liquids generated by the washdown will be contained within the containment bays. After standing washwaters are removed, the washdown will be followed by a pressure wash using a high pressure hose and/or steam cleaning equipment. An amount of water sufficient to flush any residual washwaters from the concrete pad will be used, with the water collected within the curbed area and trench. The pressure washing will be supplemented by scrubbing with a stiff broom.

All rinsewaters collected within the secondary containment system will be sampled and characterized according to the Waste Analysis Plan, Section C-2, for the appropriate contaminants to determine the effectiveness of decontamination. The waters will then be processed through the on-site Stabilization/Fixation Facility. The analysis and rinsing will continue until decontamination is found to be complete; i.e., when hazardous constituents are below specified levels as directed in the Waste Analysis Plan. The floor sumps and trench will then be rinsed with water and scrubbed where possible. After decontamination, sumps will be filled with concrete.

All spill collection areas will be similarly decontaminated. After all rinsewaters have been removed, the area will be inspected to determine if any areas require recleaning. If not, closure will be considered complete.

PROTECO personnel involved in the decontamination procedures will be equipped with appropriate personal safety equipment, which may include acid/solvent resistant overalls, head protection, gloves and boots, and full face respirators equipped with proper gas filter cartridges.

I-1d(2) Closure of Tanks.

I-1d(2)(a) General Tank Closure. This section of the Closure Plan covers storage tanks that hold hazardous wastes. Closure of all tanks which contain hazardous wastes will follow the general procedures outlined in Section I-1d. Proper implementation of these closure activities will ensure that all hazardous wastes and hazardous waste residues will be removed from tanks and loading/unloading control equipment. The closure schedule for hazardous waste storage tanks is given in Figure I-1.

I-1d(2)(b) Closure Procedures. The flow of materials entering the facility will be curtailed prior to the commencement of closure. Any waste liquid in the tanks will be identified and processed in the Stabilization/Fixation Facility where possible. The maximum storage tank inventory is shown in Table I-1.

Decontamination operations will begin by removing any liquids in the containment areas. Any liquids present will first be analyzed in accordance with the Waste Analysis Plan, Section C-2, to characterize the liquid. After the liquids are identified, they will be processed in the Stabilization/Fixation Facility. Any residual liquid on the surface of the secondary containment area will be handled as described in I-1d(1). After waste removal, the empty tank and all associated ancillary equipment will be pressure washed with hot water or steam using equipment described in I-1d(1). Compatible cleaning additives may be added to the wastewaters, as necessary to enhance decontamination. The volume of water required per rinse to accomplish thorough rinsing is estimated at three percent of the tank volume. All liquid waste feed lines, pumps and wire reinforced hoses will be backflushed and rinsed, generating an estimated 3% of the tank volume of washwater per tank. After rinsing, the waters will be analyzed for the appropriate contaminants. The rinse process will be repeated until an acceptable level of decontamination is achieved. Hazardous wash/rinsewaters will be processed through the Stabilization/Fixation Facility. The tanks, pumps and/or piping will then be disassembled and sold as scrap or disposed of in an on-site landfill. After disassembly, all secondary containment surfaces, ancillary equipment and sumps will be rinsed with an estimated 3,000 gallons of water. After decontamination is achieved, sidewalls will be removed so that water will not be impounded. Water falling within this area will not be hazardous.

I-1d(3) Closure of Waste Piles

The PROTECO facility does not have waste piles nor are any such facilities currently planned. Therefore, this section does not apply.

I-1d(4) Closure of Surface Impoundments.

I-1d(4)(a) Stormwater Retention Basin. The proposed Stormwater Retention Basin is for the collection and containment of spills and to receive emergency overflows caused by truck unloading. A closure schedule for the basin is presented in Figure I-1. At the time of closure, an estimated 10,000 gallons of waste remaining in the basin will be considered hazardous and will be processed through the Stabilization/Fixation Facility. The basin liner will then be excavated and transported to an on-site landfill for final disposal. Testing will be performed according to the procedures in Section C-2 to verify if soil contamination has not occurred. The basin area will then be regraded to prevent the ponding of rainwater.

I-1d(4)(b) Leachate Ponds A and B. Removal of the leachate in Ponds A and B will occur prior to closure of the stabilization/fixation facility. For purposes of closure, it is assumed that one lagoon will be full (120,000 gallons) and an additional 50,000 gallons will have been generated during closure activities. Therefore, 170,000 gallons will be treated in the stabilization/fixation facility, rendering the ponds empty prior to the initiation of the Post-Closure period. The leachate ponds will remain in operation during the Post-Closure period to treat and store any additional leachate flows. When leachate flows have ceased, the liquids in the pond will be allowed to evaporate, and Final Closure of the leachate ponds will begin.

A temporary Stabilization/Fixation Facility will be used to treat the remaining sludge and sediments in the ponds. All stabilized leachate wastes will ultimately be disposed of in Pond B. A leachate collection manhole will be installed in Pond B to allow removal of any leachate generated during use as a disposal unit. The liners and appurtenances of

Pond A will be excavated and disposed of with the stabilized wastes in Pond B. The subsoil of Pond A will be sampled and tested following procedures in Section C-2 to assure there is no contamination of the subsoil. Pond A will be regraded and vegetated to prevent ponding and erosion, and to create a natural appearance.

Pond B will be regraded to promote proper drainage and will receive a final cover equivalent to those placed on other disposal units.

The leachate collection manhole in Pond B will be inspected on a quarterly basis the first year. The inspections will determine leachate quantity disposal requirements and any cover maintenance which will be required. The leachate will be sampled to determine ultimate disposal. Disposal options may include transport to a Municipal Wastewater Treatment Facility or trans-shipment to the mainland for certified disposal.

Depending on leachate generation rates and cover maintenance requirements the first year, inspection intervals will be adjusted as required. Leachate disposal and cover maintenance will be performed as soon as practical after inspections have taken place. A follow-up inspection will be performed to assure proper corrective actions were performed.

I-1d(5) Closure of Incinerators. The PROTECO facility does not have an incineration facility. Therefore, this section does not apply to this application.

I-1d(6) Closure of Land Treatment Facilities. The proposed facility does not have land treatment units nor are any of these types of facilities planned. Therefore, this section does not apply.

I-1d(7) Stabilization/Fixation Facility

I-1d(7)(a) General Closure. The Stabilization/Fixation Facility process area will be closed following the general closure procedures outlined in Section I-1d. Proper implementation of these closure activities will ensure that all hazardous waste and residues will be removed from the equipment and the balance of the facility. A Closure schedule for this operation is presented in Figure I-1.

I-1d(7)(b) Closure Procedures. Closure of the Stabilization/Fixation Facility Area will involve disposal of the remaining waste inventory in the batch tanks and sumps (5,000 gallons). The contents in the tanks will be stabilized and landfilled. The tanks and their piping, pumps and appurtenances will be decontaminated according to the procedures set forth in Section I-1d(2)(b), dismantled and sold for scrap or landfilled on-site. Laboratory analyses of the wastewater samples will be conducted, as per the Waste Analysis Plan, Section C-2, to verify decontamination.

The remaining stabilization equipment will be cleaned and landfilled on-site. Non-hazardous process materials remaining in storage will be landfilled on-site or unloaded onto dump trucks and hauled off-site for beneficial reuse.

I-1d(8) Closure of Decant Facility

I-1d(8)(a) General Closure. A closure plan has been developed for the proposed decant system. Closure of the decant facility will follow the general procedures outlined in Section I-1d. Proper implementation of these closure activities will ensure that all hazardous wastes and hazardous waste residues will be removed from the equipment and the area. A closure schedule for the decant facility is presented in Figure I-1.

I-1d(8)(b) Closure Procedures. Closure of the decant system will commence by halting all operations associated with the system. Once closure has commenced, no further containers may be processed by the system.

The area around the equipment will be inspected for indications of spills or leaks. Additionally, any imminent failures of equipment will be noted. If leaks or spills are discovered, they will be cleaned up and processed following the procedures outlined in Section I-1d(1)(b). Potentially ruptured equipment will be surrounded with absorbent material and spill containment devices and later decontaminated with additional caution.

Closure will proceed by removing all material in the pipes, and pumps. If the contents of the equipment is unknown, then the liquids will be analyzed according to the Waste Analysis Plan, Section C-2. Upon verification of composition, the materials will be processed through the Stabilization/Fixation Facility.

Following liquid waste removal, sludges will be removed and processed. Decontamination will then begin. All equipment in the process chain will then be steam cleaned with water cleaning agents may be added as necessary to enhance decontamination. All liquid waste lines, pumps, and wire reinforced hoses will be backflushed and rinsed. After rinsing, the waters will be contained and analyzed for the appropriate contaminants. If the tests indicate the presence of residual hazardous contaminants in the rinsewaters, the rinsewaters will be disposed of as hazardous wastes, and the rinse process will be repeated until acceptable decontamination has been achieved. After decontamination is complete, the pipes and pumps will be disassembled and sold for scrap or disposed of in an on-site landfill.

Upon completion of equipment decontamination and disassembly, decontamination of the surrounding area will commence. All floor and wall surfaces will be steam cleaned, with rinse waters contained, analyzed and processed as a hazardous waste if determined to be required. Sumps, trenches and spill collection areas will be similarly decontaminated. After all rinsewaters have been removed, the area will be inspected to determine if any spots require recleaning. If not, sumps will be filled with concrete and closure will then be considered complete.

I-1e <u>Closure of Disposal Units</u>

This section covers the closure of hazardous landfills I and II.

As discussed in Section D-6, the landfills will be operated continuously. Waste will be placed in Stage 1 to an elevation of 360 ft prior to placing waste in the second stage of the landfill. The filling of subsequent stages will continue to permit installation of the final cover from the perimeter berms. Final cover shall be completed over the initial landfill sections as soon as possible (weather conditions permitting) upon achieving capacity. If immediate closure should be required, the fill would be regraded to promote proper drainage and final cover would be placed.

Leachate Ponds A and B will remain open during the post closure period as discussed in Section I-1d(4)(b).

I-1e(1) Cover Design. The final cover of the secure landfill is similar in design to the bottom liner system and consists of compacted clay, synthetic membrane, and vegetative cover. The perimeter of the cap is tied into the bottom liner system so as to totally encapsulate and isolate the waste placed in the secure landfill.

The secure landfill is designed to shed water, and is therefore sloped downward from the center towards the perimeter. The final cover materials and thicknesses have been selected to limit infiltration into the placed wastes and thereby reduce leachate generation. Additionally, thicknesses of cover soils have been selected to reduce the possibility of waste containers or debris coming in close proximity to the impermeable materials. The final cover design which accomplishes the aforementioned objectives consists of five layers of various materials. In ascending order these layers are:

- Two feet of clay compacted to a maximum permeability of at least 1×10^{-7} cm/sec;
- A synthetic membrane (80 mil HDPE) and drainage net;
- Filter fabric
- One foot of unclassified protective cover
- One foot of topsoil suitable for promoting a vegetative cover.

A profile of the final cover is shown in "Proposed Secure Hazardous Waste Landfill Facilities", Drawing Number B511E-L27; however, final sloping and grading will be dependent upon the amount of hazardous waste present in the subcells at the time of closure.

The recommended final cover design has several advantages. First, it limits infiltration such that leachate generation, and in turn, leachate outcropping, will be strictly minimized. Second, by placing the clay under the synthetic membrane, the 80 mil HDPE should have a good supporting base, thus helping to maintain its integrity. Third, by placing the clay under the membrane, the HDPE is more accessible should any future repair be necessary; and any such remedial effort would not be hampered by the difficulties encountered in performing remedial actions immediately on top of the waste. Finally, the synthetic membrane will also keep the underlying clay from drying out during a prolonged drought. This will help prevent cracks from developing which would compromise the effectiveness of the clay barrier.

Above the synthetic membrane, the one foot of soil will provide adequate room for root growth without long-term saturation of the soil or significant buildup of excess water.

After final cover soil is completed and in place, the site will be seeded during the next growing season. Proposed seed mixes may be found in "Technical Specifications, Proposed Hazardous Waste Landfill and Surfacewater Management Facilities, June 31, 1986. Temporary vegetative stabilization will be used if the time of year is such that final revegetation cannot be achieved due to less than optimum seeding conditions. Alternate seeding mixtures suitable to local soil conservation district guidelines may be substituted as appropriate for the actual topsoil used.

The final cover cap will be graded to slope from the center to the perimeter berm, and from there will make a transition to the perimeter berms as shown in "Proposed Secure Hazardous Waste Landfill Facilities", Drawing Number B511E-L20;. As previously discussed in this report, the final cover will be installed in sections, as maximum waste elevations are achieved, and final grading will be dependent upon the amount of hazardous waste present in the subcells at the time of closure.
(0573B)

Because none of the wastes to be disposed of in the hazardous waste landfill are putrescible, and therefore not subject to decomposition, landfill gas venting has not been determined to be required. Calculations of soil loss and the drainage layer may be found in Appendix I.1.

I-1e(2) Minimization of Liquid Migration. Both hazardous waste landfills will have berms and subcell berms. These berms will be constructed as an integral part of the bottom liner and will keep liquids from migrating from subcell to subcell. The final cover (two feet compacted clay and 80 mil HDPE) will keep leachate from outcropping and rainwater from infiltrating into the landfill. The double lining system (detailed in Section D-6) is designed to contain leachate and convey it efficiently to leachate collection system for transfer to the treatment/storage basins.

I-1e(3) Maintenance Needs. Maintenance activities will be required to ensure the integrity of the cover, containment structures and monitoring equipment for the landfills. The succession seeding mix selected will promote rapid initial cover followed by succession to a long-term, low maintenance vegetative cover several feet in thickness.

The function and integrity of the final cover for landfills as specified in the closure plan for the facility will be maintained as necessary. A detailed visual inspection or significant increase in leachate generation in the cell indicate possible cover deficiencies. In the event deficiencies are discovered, the following corrective measures may be implemented: (1) localized repair or replacement of any synthetic cover material which may have been breached; (2) filling, grading, compacting and revegetating any breach in the natural cover soil which may have occurred; and/or (3) minor backfilling of any small ponded areas.

The vegetative cover will be maintained as required during the growing season, and reseeded and mulched as needed in areas subject to excessive erosion. In general, the cover will not require mowing, due to the local climate. Plants and trees appearing above the vegetative layer will be removed semi-annually.

Fertilization and watering will be completed as required during the growing season. Inspections for rodent and insect control will be conducted during routine post-closure site inspections with extermination scheduled if required.

I-1e(4) Drainage and Erosion. Drainage and erosion control plans and details can be found in Section D-6n, Runon/Runoff Control. Runoff volumes, transport and containment capacities calculations can be found in Appendix D-6.4.

I-1e(5) Settlement and Subsidence. Because the wastes being disposed of in the hazardous waste landfills are not subject to decomposition, differential settlement related to this cause is not anticipated. Stabilization tests performed on various waste streams will determine proper mixes to assure the wastes will remain consolidated and not be subject to waste dewatering or chemical conversion from solids to liquids.

The cover will not be subjected to stress loadings such as buildings foundations or traffic. Cover maintenance will also be performed to reduce stress associated with any ponding liquids. Therefore, compressive forces will not induce either primary or secondary consolidation. Furthermore, liquifaction of the soil in the cover is not a threat, as liquifaction typically occurs only in relatively loose, saturated, cohesionless soils, which are not to be used as cover material. The yield point of the selected HDPE material is much greater than the expected maximum geomembrane elongation, thereby keeping the liner intact in the event that some settlement does occur.

I-1e(6) Cover Permeability. The clay layer of the composite cover will have a permeability of at least 1×10^{-7} cm/sec^2 and the 80 mil HDPE geomembrane has a 1×10^{-12} cm/sec^2 permeability rating. Additional technical information can be found in Section D-6.

I-1e(7) Freeze/Thaw Effects. The climate of Puerto Rico does not result in freeze/thaw effects.

I-1f Schedule for Closure

This section addresses closure of the proposed facilities at some unforeseen time in the future. Table I-2 shows the planned sequencing of closure activities. The Proposed Closure Schedules are shown in Figure I-1. The closure sequence and schedule addresses closure for all proposed facilities.

Closure activities will commence within 30 days after receipt of final volume of hazardous wastes at the site. Closure will be completed within 180 days of this occurrence, or longer if necessary. The Region II Administrator will be notified by PROTECO 180 days before the beginning of any closure activities, either partial or final closure. Closure activities will be considered complete when both an independent registered Professional Engineer and PROTECO submit their certification to the Regional Administrator.

I-1g Extensions for Closure Time [40 CFR 264.113(a) 264.113(b)]

PROTECO does not anticipate requiring an extension for closure time for any of their facilities, either existing or proposed. However, if all facilities at the site were to be closed at one time PROTECO envisions that an extension would be necessary. Also, severe weather conditions at the PROTECO site may make completion of closure within 180 days difficult, and an extension of the closure time may be needed. In the event such an extension becomes necessary, for these reasons or due to some other unforeseen circumstances, PROTECO will petition the Regional Administrator for an extension.

I-2 Post-Closure Plan

All hazardous waste management facilities that have disposal operations are required by 40 CFR 264.118 to have a Post-Closure Plan which identifies the activities that must be carried on after the facility is closed. The regulations require that post-closure care of the facility be continued for 30 years after the date of completing closure, unless the

EPA Regional Administrator has determined that a reduced period is sufficient to protect human health and the environment.

The Post-Closure Plan will ensure: (1) that the need for further maintenance is minimized and (2) that the post-closure escape of hazardous waste, hazardous waste constituents, leachate, contaminated rainfall or waste decomposition products to groundwater or surface waters or to the atmosphere is controlled, minimized or eliminated so as to protect human health and the environment.

This Post-Closure Plan is based upon an assessment of the potential risk to public health and the environment posed by sudden or planned abandonment of the PROTECO facility. The major factors entering into this assessment are: (1) types of hazardous waste; (2) the environmental setting; (3) the means of treatment, storage and disposal; (4) the environmental pathways by which hazardous waste constituents may travel; and (5) the human and ecological resources which could be affected.

This Post-Closure Plan for the PROTECO facility identifies post-closure care activities that will be carried out after closure and certification. This plan presents the requirements for post-closure care activities, including periodic groundwater and leachate monitoring, site inspections and maintenance activities, and measures to assure restricted site access.

A copy of the approved post-closure plan and any subsequent revisions will be kept at the facility until the facility post-closure period begins. At that time, an updated copy of the approved plan will be kept at the facility.

The Post-Closure Plan will be amended whenever changes in operating plans, facility design or other factors (including a change in the expected year of final site closure) affect the plan. If PROTECO requests a permit modification during the active life of the facility to cover planned changes, a copy of the amended plan will be submitted at the same time as the permit modification application is submitted. If no permit modification is required, a copy of the amended Post-Closure Plan will be submitted within 60 days after a change affecting the Post-Closure Plan occurs.

I-2a Post-Closure Activities

The Post-Closure Plan addresses post-closure facility care of the closed landfills at the PROTECO facility. Post-Closure will begin when the entire site is closed.

During the post-closure period for landfill care, it is assumed that on-site leachate treatment/storage basins will continue for leachate treatment and will close down after leachate production ceases. This assumption is made for the closure/post-closure scenario.

The post-closure scenario utilized in this plan covers a reasonable time frame of operations to estimate post-closure costs associated with the maximum extent of facility operations until 2010. The Post-Closure Plan will be revised when actual facility operations deviate from this plan according to 40 CFR 264 Subpart G rules and regulations.

I-2b Post-Closure Inspection Plan

The closed landfills will be inspected quarterly and/or after periods of significant rainfall. The purpose is to ensure that the closure measures taken to prevent migration of contaminants are operating as intended. Inspection of the general site will focus on access barriers and security control devices (e.g., fences, locks and gates) to see that they are visible and functioning properly. The components of the landfills which will be inspected include: (1) the cover, (2) the stormwater control system, (3) the leachate collection system, (4) the leachate detection system, (5) the groundwater monitoring system. Inspection procedures for each of these items are described in more detail below.

The cover will be inspected for: (1) the condition of the vegetation, (2) signs of erosion, and (3) subsidence. The protection provided by the cover vegetation should be complete, repairs to bare spots will include reseeding, fertilizer application and soil conditioning. As part of the visual inspection of the landfills, the inspector will walk along the top of the berm, look for erosion rivulets or slides on the slopes on either side; for signs of settling and unevenness along the top edge; for signs of accumulated liquids (puddles, dampness) on the sloping sides of the berms. The facility manager will review the inspector's comments, conduct a follow-up inspection of the area noted and determine what maintenance work is needed to correct the problem. Mitigating actions that may be implemented include improving the vegetation and altering contours to prevent stormwater runoff from reaching scour velocities.

Cap settlement will be monitored by site personnel. When an inspection shows that sections of the cover have subsided (lowered), those sections will be repaired as necessary (i.e., backfilled, regraded and/or seeded).

Stormwater runoff is controlled by a series of diversion ditches and berms detailed in Section D-6. The berms will be inspected for cracks; cracks will be marked and their location and size will be recorded. Cracks will be monitored during subsequent inspections; if necessary, affected portions of the berms will be repaired or replaced. The berms will also be checked for surface deterioration. Damaged surfaces will be repaired. Diversion ditches and culverts will be inspected to see that silt, weeds or debris do not accumulate and interrupt flow. Ditches will also be inspected for erosion and undermining. They will be kept cleared and functional.

The leachate collection and transmission systems for the landfills will be inspected to insure that they are operational. The inspection will cover the physical condition and operational status of the manholes, sumps, pumps, valves and electrical system. The leachate will be discharged into the leachate treatment/storage system. A copy of the Post-Closure Inspection Form can be found in Appendix I.2.

I-2c Post-Closure Monitoring Plan

I-2c(1) Air Monitoring Plan.

Since the waste handling, landfilling and processing activities will have ceased and the landfills will have been capped, no atmospheric emissions should occur from the closed facility. Post-Closure inspection and maintenance will ensure the cap remains intact and no emissions can occur.

I-2c(2) Groundwater Monitoring Plan. Upon completion of the useful life of the facility, the remaining uncovered landfills will be sealed. However, wastes will still remain buried at the site with the potential for leachate migration and subsequent contamination of groundwater. In accordance with RCRA regulations, a groundwater monitoring plan has been developed for the post-closure period that is capable of detecting the leakage of contaminants from the facility. The plan will utilize the monitoring wells installed for the pre-closure groundwater monitoring program.

The facility groundwater monitoring plan, as discussed in Section E of this application, Groundwater Monitoring, will also be used for monitoring the groundwater during the post-closure period. Parameters and analytical methods will be the same as those used for the active units.

The monitoring frequency for active units is quarterly. It is anticipated that annual sampling during the post-closure period will be adequate for the detection of escaped contaminants.

I-2d Post-Closure Maintenance Plan

Maintenance activities will be required to ensure the integrity of the cover, containment structures, leachate system and monitoring equipment for the landfills.

The function and integrity of the final cover for landfills as specified in the Closure Plan for the facility will be maintained as necessary should visual inspection of the cover identify deficiencies. In the event deficiencies are discovered, the following corrective measures may be implemented: (1) repair or replacement of any synthetic cover material which may have been breached and/or (2) filling, grading, compacting and revegetating any breach in the natural cover soil which may have occurred.

The vegetative cover will be maintained as required during the growing season, and reseeded and mulched in areas subject to excessive erosion.

Fertilization will be done as necessary. Watering will be done as required during the growing season, and spraying for rodent and insect control will be conducted according to the findings of the post-closure site inspection plan.

Specific maintenance procedures and schedules for the groundwater monitoring system are outlined in Section E, Groundwater Monitoring, of this application.

I-3 Notice in Deed and Notice to Land Authority [40 CFR 122.25(a)(14)]

PROTECO, Inc., the owner of the property where the facility is located, shall make a notation in the deed to the facility property stating in perpetuity that:

1. The land as described in Appendix I.3 has been used to manage hazardous wastes, and that;

2. The use of the land is restricted in accordance with 40 CFR 264.120.

Within 90 days after closure is completed, PROTECO will submit to the Region II Administrator a survey plat indicating the location and dimensions of landfill cells or other disposal areas with respect to permanently surveyed benchmarks. This plat will be prepared and certified by a professional land surveyor. The plat filed will contain a note, prominently displayed, which states PROTECO's obligations to restrict the disturbance of the site. This includes eliminating inadvertent site access by the general public and livestock, to be accomplished by maintaining the integrity of the existing fence around the facility. In addition, this notice will indicate that post-closure use of the property on or in which hazardous waste remains after closure must never be allowed to disturb the integrity of the final cover, liners or any containment component, or the function of the facilities monitoring system.

Further, within 90 days of the completion of closure activities, PROTECO will submit to the Regional Administrator a record of the type, location and quantity of hazardous wastes disposed within each cell or area of the facility. Wastes disposed of before the effective date of the RCRA Regulations (July 26, 1982), will be identified by type, location and quantity.

I-4 Closure Cost Estimate [40 CFR 122.25(a)(15) and 264.142]

Closure cost estimates have been developed for the closure of all proposed facilities at PROTECO. Operations included in this cost estimate include the Secure Landfills, Container Storage Building, Tank Farm, Stabilization/Fixation Facility, Stormwater Retention Basin and Leachate Cup Ponds A and B.

The closure costs are summarized in Table I-3. Costs for the closure of each operational unit are provided in Tables I-4 through I-9. The costs relating to closure activities such as waste sampling and analysis, removal of waste inventory, decontamination of facilities equipment, containment pads, building floor areas, on-site disposal of decontaminated equipment and facilities, capping of landfill facilities and closure certification are included in each table. The List of Unit Prices used for calculations are provided in Appendix 1.4. The Final Cover Cost Estimate breakdown is provided in Appendix 1.5. The breakdown of other unit costs will be provided with the March 31, 1986 submittal. In addition, it was assumed that fifty percent of all motorized equipment is inoperative time at time of closure, and the landfill has a partially completed stage and the next stage has been excavated and lined.

TABLE I-3

CLOSURE COST ESTIMATES

		COST ($)	Table
1.	Landfill	816,000	I-4
2.	Container Storage Building	166,000	I-5
3.	Tank Farm	118,000	I-6
4.	Stabilization/Fixation Facility	28,000	I-7
5.	Stormwater Retention Basin	10,000	I-8
6.	Leachate Ponds A & B	185,000	I-9
	TOTAL	1,323,000	

TABLE I-4

CLOSURE COST ESTIMATE FOR LANDFILL FACILITIES AND ABANDONED LANDFILL EQUIPMENT

A.	Decontamination Cost (1600 gallons x $0.46/gal -- Volume required to cleanup an estimated 8 pieces of equipment.)	736
B.	Laboratory Verification of Decontamination (7 samples x $260/sample)	2,080
C.	Dismantling and Disposal Cost of One Bulldozer	
	1. Labor (4 man-days x $180/man-day)	720
	2. Landfill of Dismantled Bulldozer (8 cy x $19/cy)	152
D.	Dismantling and Disposal Cost for One Front-End Loader	
	1. Labor (3 man-days x $180/man-day)	540
	2. Landfill of Dismantled Front-End Loader (5 cy x $19/cy)	95
E.	Dismantling and Disposal Cost of One Tractor	
	1. Labor (3 man-days x $180/man-day)	540
	2. Landfill of Dismantled Tractor (10 cy x $19/cy)	190
F.	Dismantling and Disposal Cost of One Half-ton Pick-up Trucks	
	1. Labor (1 man-day x $180/man-day)	180
	2. Landfill Dismantled Pick-up (5 cy x $19/cy)	95

TABLE I-4 (CONTINUED)

CLOSURE COST ESTIMATE FOR LANDFILL FACILITIES AND ABANDONED LANDFILL EQUIPMENT

G. Capping of Landfill (For Individual Costs see Appendix I.5)	
1. Final Cover at (18,400 yd^2 x \$17.63/yd^2)	324,400
H. Fill Material Required to Bring Landfill to Grade (104,900 cy x \$3/cy) Assuming Partial Closure Scenario	314,700
O. Certification	500
Subtotal	645,000
Administration @ 10%	64,500
Subtotal	709,500
Contingency @ 15%	106,425
TOTAL CLOSURE COST ESTIMATE FOR ABANDONED LANDFILL AND EQUIPMENT	816,000

Note: Costs represent closure of one stage of the landfill and the filling of the next stage to grade. This is due to only one stage being in operation at a time (largest surface area used for estimate).

TABLE I-5

CLOSURE COST ESTIMATE FOR CONTAINER HANDLING AND STORAGE BUILDING AND CONTAINER DECANT AREA

A. Disposal Cost of Remaining Inventory	
• 675 drums of Hazardous Wastes Various Categories @ \$27.50/drum	18,600
• 350 drums of incinerable wastes @ \$300/drum	105,000
B. Decontamination Cost	
(9,000 gallons* x \$0.46/gal)	4,140
C. Dismantling and Disposal Cost of One Forklift	
1. Labor (3 man-days x \$180/man-day	540
2. Landfill of Dismantled Forklift (5 cy x \$19/cy	95
D. Removal of Landfill Cost of Conveyor, Piping, Pumps and Associated Control Devices	
1. Labor (2 man-days x \$180/man-day)	360
2. Landfill (40 cy x \$19/cy)	760
E. Laboratory Verification of Decontamination Analysis Cost (1 sample x \$260/sample)	260
F. Certification	500

* Estimated quantity is volume required to clean-up 13,500 sf of floor area and 3 pieces of equipment.

Subtotal	131,000
Administration @ 10%	13,100
Subtotal	144,100
Contingency @ 15%	21,615
TOTAL CLOSURE COST ESTIMATE FOR CONTAINER STORAGE BUILDING AND CONTAINER DECANT AREA:	166,000

TABLE I-6

CLOSURE COST ESTIMATE FOR TANK FARM

A. Disposal Cost of Remaining Inventory	
1. 15,000 gal (caustic) @ $0.46/gal (T1)	$ 6,900
2. 30,000 gal (acid) @ $0.46/gal (T2)	13,800
3. 10,000 gal (neutralization) @ $0.46/gal (T3)	4,600
4. 30,000 gal (solvents) @ $0.46/gal (T4 & T5)	13,800
5. 30,000 gal (oil sludge) @ $0.46/gal (T6)	13,800
6. 15,000 gal (aqueous waste) @ $0.46/gal (T7)	6,900
7. 30,000 gal (oils) @ $0.46/gal (T8)	13,800
B. Laboratory Verification of Decontamination (10 samples x $260/sample)	2,600
C. Disposal of Washwater + Containment Water During Closure	
9,600 gallons* @ $0.50/gal (washwater)	4,420
D. Removal and On-Site Landfill Cost of Tanks, Piping, Pumps and Associated Control Devices	
1. Labor (10 man-days x $180/man-day)	1,800
2. Equipment Rental	
a. Crawler Crane (4 days x wk/5 days x $5,400/wk)	4,320
3. Fuel Consumption	
a. Crane - (32 hrs x $50/hr)	1,600
4. Landfill (200 cy x $19/cy)	3,800
E. Certification	500

* Estimated quantity is volume of water required to clean up 8 tanks, 7,700 sf floor area.

Subtotal	93,000
Administration @ 10%	9,300
Subtotal	102,300
Contingency @ 15%	15,345
TOTAL CLOSURE COST ESTIMATE FOR EXISTING AND PROPOSED TANKS	$118,000

TABLE I-7

CLOSURE COST ESTIMATE FOR STABILIZATION/FIXATION FACILITY

A.	Process Cost for On-site Stabilization of Inventory (5,000 gal x $0.46/gal),	2,300
B.	Removal and On-Site Landfill Costs of Tanks, Equipment, Piping, Pumps and Associated Control Devices	
	1. Labor (30 man-days x $180/man-day)	5,400
	2. Equipment	
	a. Cherry picker (1wk x $950/wk)	950
	b. Full decontamination of two vacuum trucks 2,500 gal x $0.46/gal	1,150
	3. Fuel	
	a. Cherry picker (40 hrs x $5/hr)	200
	4. Landfill (300 cy x $19/cy)	5,700
C.	Dismantling and Disposal Cost of One Dump Truck	
	1. Labor (3 man-days x $180/man-days)	540
	2. Landfill of Dump Truck (20 cy x $19/cy)	380
D.	Decontamination Cost	
	(3,800 gallons* x $0.46/gal)	1,750
E.	Laboratory Verification of Decontamination Analysis Cost (10 samples x $260/sample)	2,600
F.	Certification	500

* Estimated quantity is volume required to clean-up 1 silo, 2 tank, 3540 sf floor area and 4 pieces of equipment.

Subtotal	22,000
Administration @ 10%	2,200
Subtotal	24,200
Contingency @ 15%	3,630
TOTAL CLOSURE COST ESTIMATE PROPOSED STABILIZATION FACILITY:	28,000

TABLE I-8

CLOSURE COST ESTIMATE FOR
STORMWATER RETENTION BASIN

A.	Disposal of Contaminated Stormwater & Sediments (10,000 gallons x \$0.46/gallon)	4,600
B.	Excavation and Disposal of Basin Liner ($465\ yd^2 \times \$0.50/yd^2$)	235
C.	Laboratory Verification of Uncontaminated Subsoil (5 samples x \$260/sample)	1,300
D.	Regrading (300 cy x \$3/cy)	900
E.	Seeding ($425\ yd^2 \times \$0.23/yd^2$)	100
F.	Certification	500
	Subtotal	8,000
	Administration @ 10%	800
	Subtotal	8,800
	Contingency @ 15%	1,320
	TOTAL CLOSURE COST ESTIMATE FOR STORMWATER RETENTION BASIN	10,000

TABLE I-9

CLOSURE COST ESTIMATE FOR
LEACHATE PONDS A & B

A.	Disposal of Contaminated Leachate* (170,000 gallons x $0.46/gallon	78,200
B.	Equipment Rental 1. Temporary Pug Mill (3wk x $10,000/wk)	30,000
C.	Stabilization/Fixation of Materials after evaporation (110 cy x $92.43/cy)	10,200
D.	Installation of Leachate Collection Manhole (1 x $1,000/unit)	1,000
E.	Excavation of One Pond Bottom Liners & Appurtenances (200 yd^3 x $10.00/$yd^3$)	2,000
F.	Laboratory Verification of Uncontaminated Subsoil (10 samples x $260/sample)	2,600
G.	Regrading (2,000 yd^3 x $3/$yd^3$)	6,000
H.	Final Cover (900 yd^2 x $17.63)	15,900
I.	Certification	500

* Leachate disposal occurs prior to Stabilization/Fixation Facility Closure. Volume assumes only one pond is full and 50,000 gallons are generated during closure activities.

Subtotal	146,000
Administration @ 10%	14,600
Subtotal	161,000
Contingency @ 15%	24,150
TOTAL CLOSURE COST ESTIMATE FOR LEACHATE PONDS A & B:	185,000

I-5 Financial Assurance Mechanism for Closure

[40 CFR Sections 270.14(b)(15), 122.25a(1), 264.143, and 254.150]

I.5a Closure Trust Fund [40 CFR Sections 264.143(a) and 264.151(a)(1)]

PROTECO has established an Irrevocable Standby Letter of Credit and Standby Trust Fund Agreement as the selected financial assurance mechanism for the closure of all existing facilities. An original signed duplicate of the trust agreement Letter of Credit and Standby Trust Fund Agreement will be provided at a later date. This standby trust fund will have the US Environmental Protection Agency as its beneficiary. PROTECO reserves the right to change the mechanism of financial assurance, should it deem necessary, as outlined in 40 CFR 151(a)(1).

I-6 Post-Closure Cost Estimate [40 CFR Sections 122.25(a)(16) and 264.144]

An estimated $4,602,000 will be required to fulfill the monitoring and maintenance activities for the thirty (30) year post-closure period. This estimate represents the cost of the post-closure care requirements for Landfills I and II. The cost estimates are presented by activity in Table I-10, and the List of Unit Prices forming the basis for the calculation are located in Appendix 1.4.

This post-closure cost estimate will be kept on file at the PROTECO site. It will be revised whenever a change in the post-closure plan affects the cost of post-closure. It will be adjusted annually (from the date of its original development) to reflect changes in post-closure costs brought about by inflation. The Department of Commerce's Annual Implicit Price Deflator for Gross National Product (published by the US Department of Commerce in the monthly publication "Survey of Current Business") will be used to make this adjustment.

TABLE I-10

POST-CLOSURE COST ESTIMATE

A.	Site Inspections (4 x $100)	4,000	120,000
B.	Site Security and Maintenance		
	1. Supplies	1,000	30,000
	2. Perimeter Fence Maintenance (assume $1000/yr)	1,000	30,000
	3. Maintenance of Bench Marks (survey, 3 man-days every 5 years @ $50/hr)	240	7,200
C.	Site Groundwater Monitoring		
	1. 25 wells x $2000/well	50,000	1,500,000
D.	Maintenance of SLF Covers		
	1. Irrigation of Vegetative Cover (years 1-3)	1,000	3,000
	2. Fertilization of Vegetative Cover (years 1-3) (20.3 acres x $242/acre)	5,000	15,000
	4. Replacement of Lost Topsoil, furnished & spread (250 sy @ $3.00/sy)	750	22,500
	5. Repair/Replacement of Cover (0.5% complete replacement; 0.5% repair clay and topsoil, and revegetate only.)	10,250	307,500
E.	Leachate Collection, Transport & Treatment Systems		
	1. Replacement of Pumps (1 pump per year @ $800/pump)	800	24,000
	2. Leachate Analysis (10 samples)	2,600	
	3. Cost of Leachate Collection and Treatment in off-site treatment Facility (leachate volume is estimated to be; an average average of 100,000 gal/yr during post closure; treatment @ $0.46/gal, includes sludge disposal)	46,000	1,380,000
	5. Clean and repair pumps (2 pumps @ $300 each)	600	18,000

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TABLE I-10 (CONTINUED)

POST-CLOSURE COST ESTIMATE

G. Maintenance of Stormwater Drainage Control Systems		
1. Cleaning of drain pipes, catch basins and control valves; cleaning and dredging of drainage ditches	5,000	150,000
2. Maintenance of Stormwater Basins	1,000	30,000
Subtotal	$130,000	$3,638,000
Administration @ 10%	13,000	363,800
Subtotal	143,000	4,001,800
Contingency @ 15%	21,450	600,270
TOTAL (1986) POST-CLOSURE COSTS:	$164,500	$4,602,000

I-7 Financial Assurance Mechanism for Post-Closure [40 CFR Sections 122.25(a)(16) and 264.145]

I-7a Post-Closure Trust Fund [40 CFR 264.145]

PROTECO will establish an Irrevocable Standby Letter of Credit and Standby Trust Fund agreement as the selected financial assurance mechanism. An original signed duplicate of the trust agreement Letter of Credit will be sent to the Region II Administrator by certified mail. This Standby Trust Fund will have the US Environmental Protection Agency as its beneficiary. PROTECO reserves the right to change the mechanism of financial assurance, should it deem necessary, as outlined in 40 CFR 145.

I-8 Liability Insurance [40 CFR Sections 122.25(a)(17) and 264.147]

I-8a Coverage for Sudden Insurance [40 CFR Sections 264.147(a), 264.151(i) and 264.151(j)]

PROTECO has obtained liability insurance for sudden and accidental occurrences in the amount of $1,000,000 per occurrence with an annual aggregate of $9,000,000 exclusive of legal defense costs. The certificate is worded as specified in 40 CFR 264.151(g).

I-8b Coverage for Non-sudden Insurance [40 CFR 264.147(b), 264.151(i) and 264.151(j)]

PROTECO has obtained liability insurance for non-sudden occurrences in the amount of $3,000,000 per occurrence with an annual aggregate of $6,000,000, exclusive of legal defense costs. The certificate is to be worded as specified in 40 CFR 264.151(g).

The following table is a list of unit prices used in the derivation of closure cost estimates for proposed units at the PROTECO Facility. These unit prices are based on compromises between HART estimates and the NOD, acceptance of NOD values and updated cost information.

APPENDIX I.1

CALCULATIONS OF SOIL LOSS AND EFFECIVENESS OF DRAINAGE LAYER

(0573B)

BY MMT DATE 2/11/86 CHK'D BMM DATE 3/12/86	FRED C. HART ASSOCIATES, INC.	SHEET 1 OF 5 PAGE

SUBJECT Proteco JOB NO. 8511

Estimate annual soil loss on final cover:

Use Universal Soil Loss Equation:

$$A = RKLSCP$$

ref: Sanitary Landfill Design Handbook, pp 100-105

where: A = gross erosion in tons/acre/year
R = rainfall energy index
K = soil erodibility factor
LS = Length/slope factor
C = cover factor
P = practice factor

Determine the following parameters:

1) $$R = \frac{EI_{30}}{100}$$

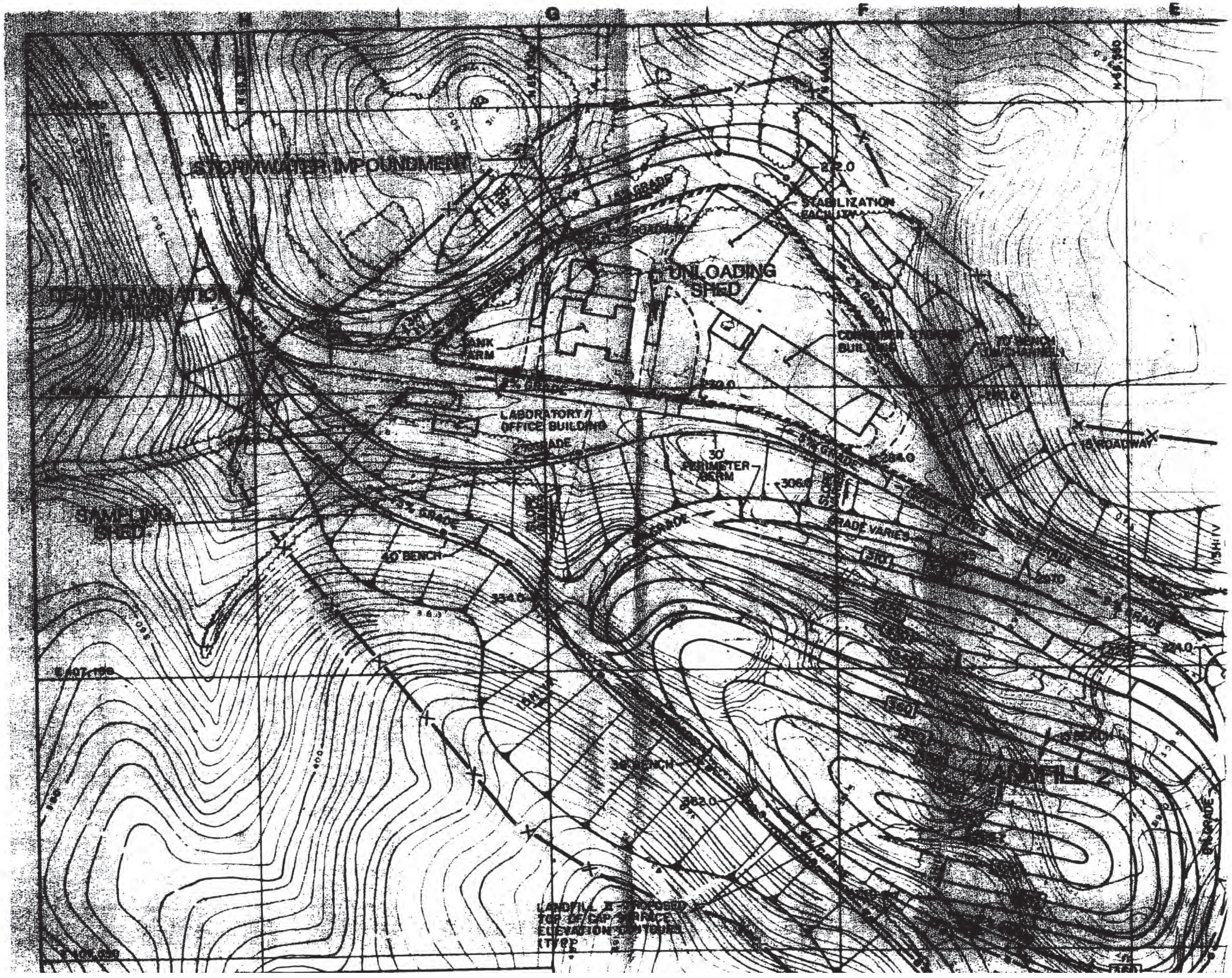
where: $E = 916 + 313 \log_{10} I_{30}$

I_{30} = maximum thirty minute storm intensity
= 4.0" (100 yr - 30 min rainfall, from TP 40, Rainfall Frequency Atlas of US, data for Southern Florida)

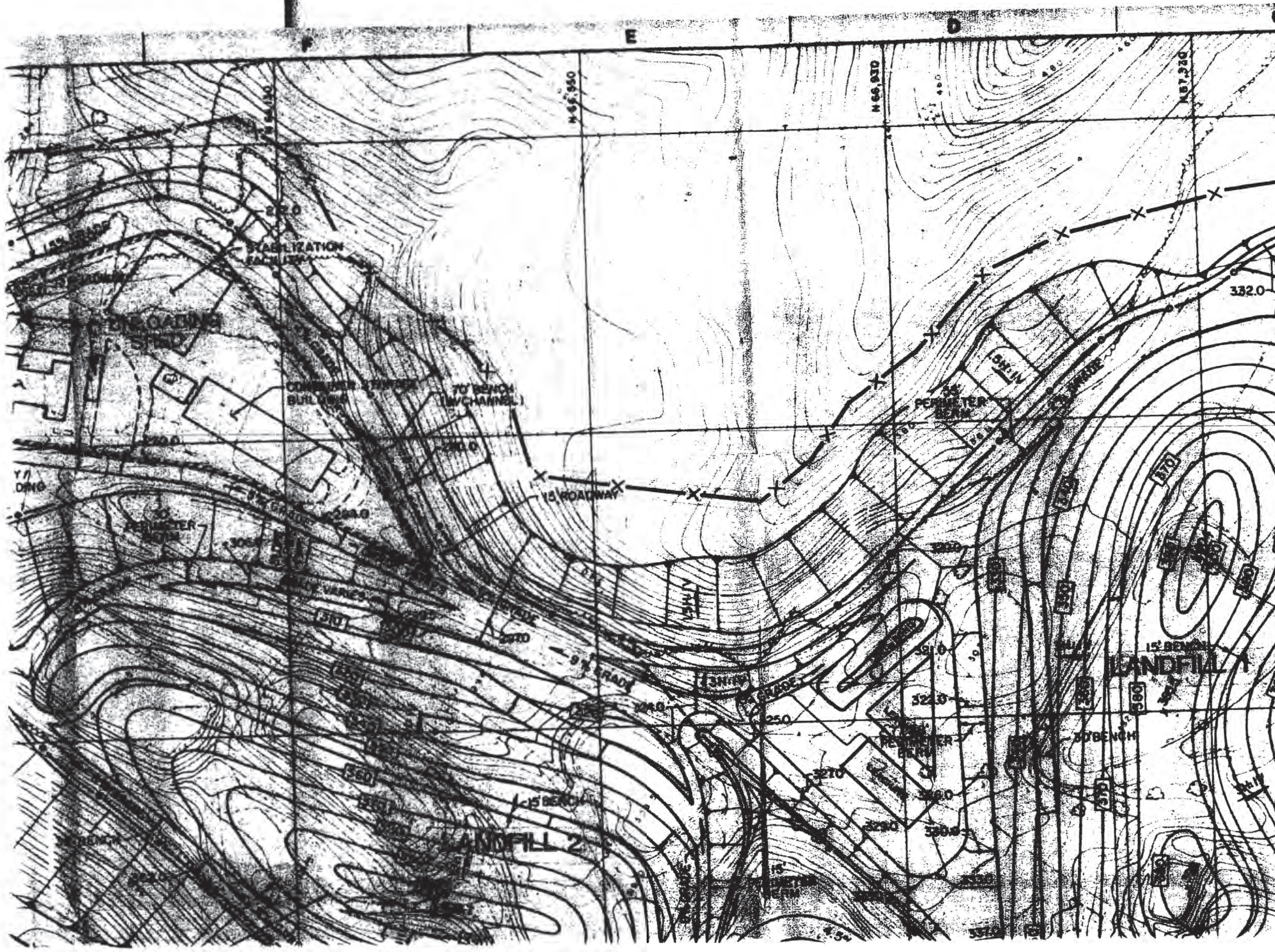
$\therefore E = 916 + 313 \log_{10}(4") = 1104$ in

$\therefore R = \frac{(1104")(4")}{100}$

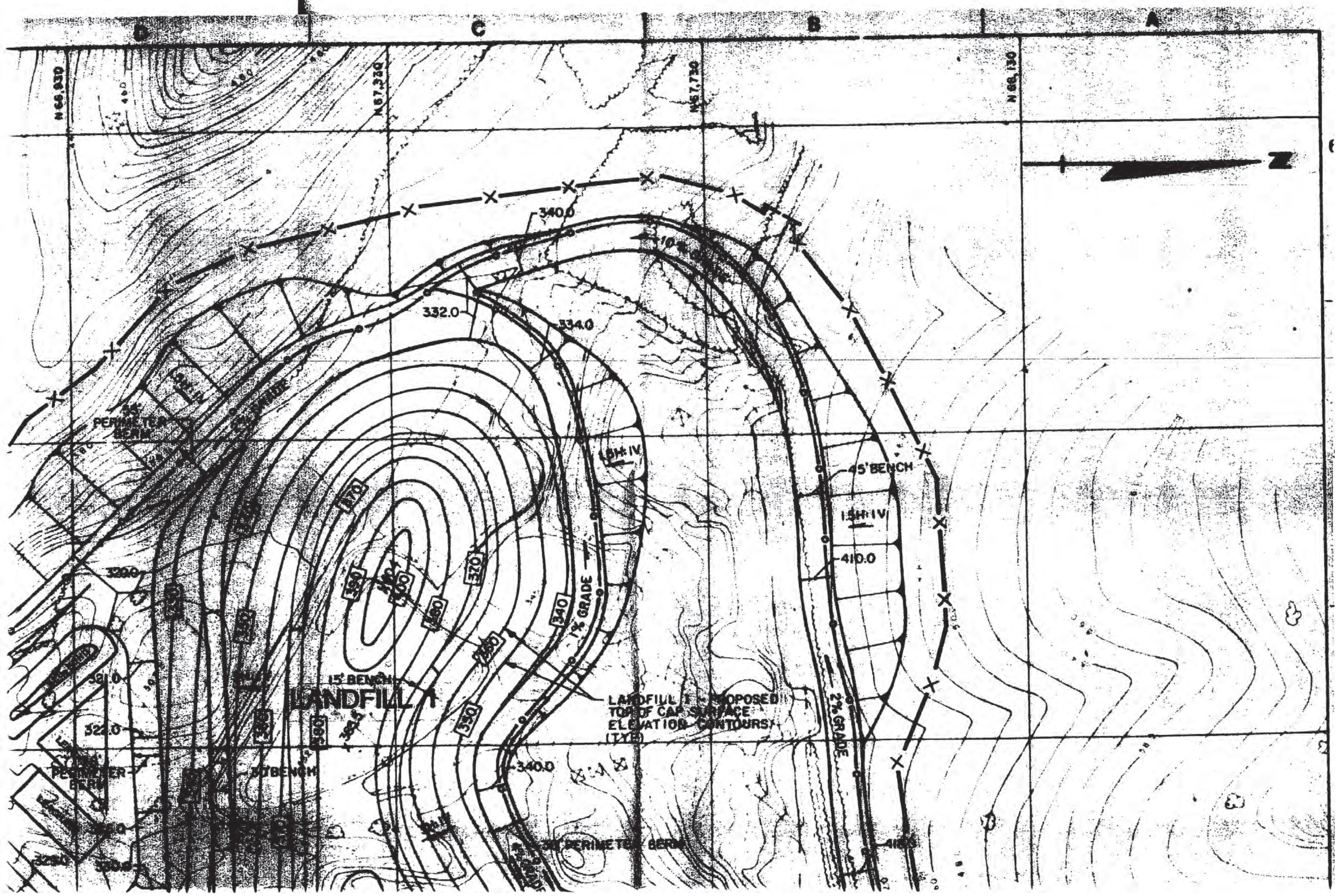
$R = 44$



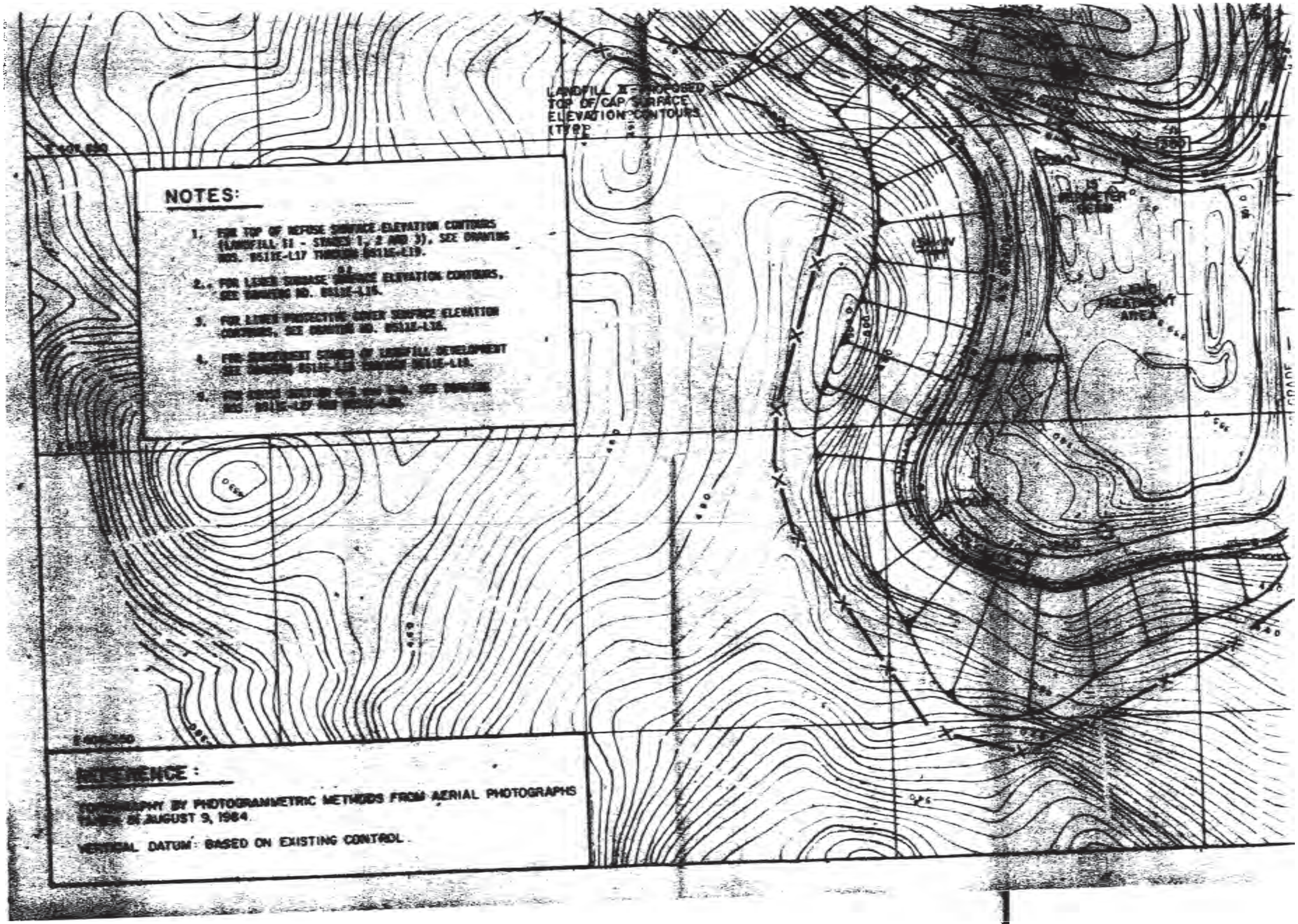
H
G
F
E
STORMWATER IMPOUNDMENT
STABILIZATION FACILITY
UNLOADING SHED
TANK FARM
LABORATORY / OFFICE BUILDING
30' PERIMETER BERM
GRADE VARIES
SAMPLING SHED
10' BENCH
LANDFILL 2
ROADWAY

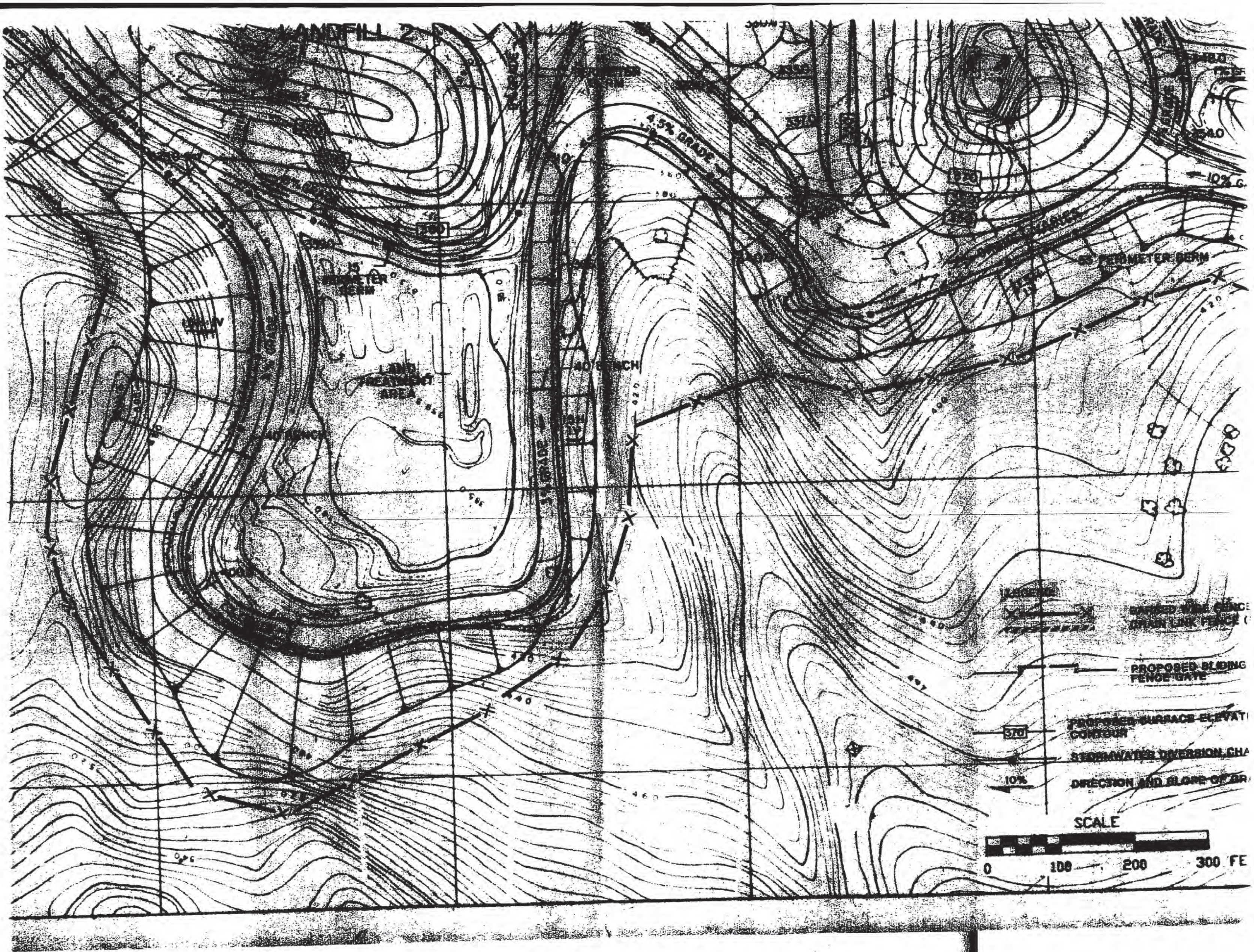


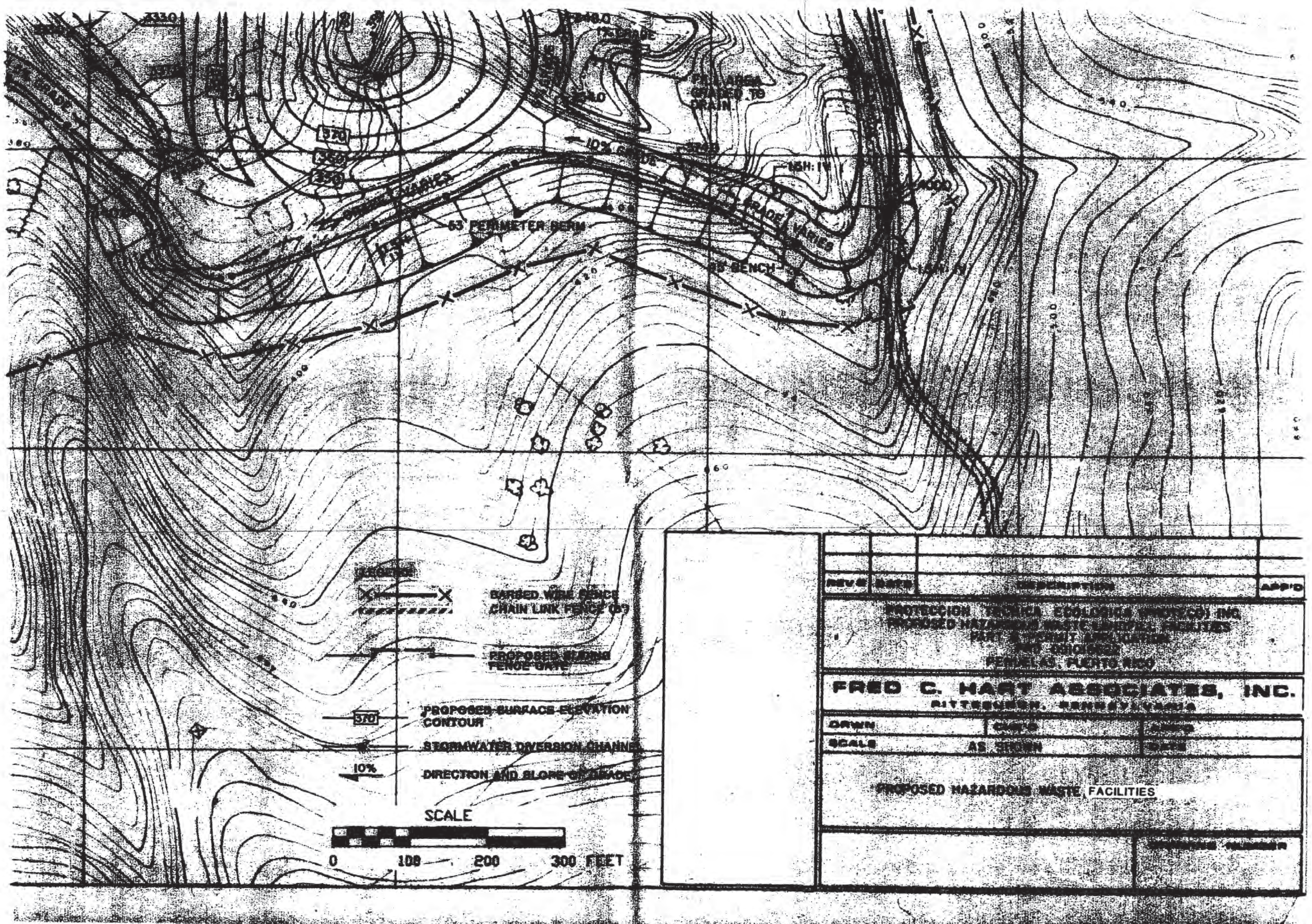
F
E
D
C
N 66,950
N 66,930
N 67,330
332.0
STABILIZATION FACILITY
UNLOADING SHED
CONTAINER STORAGE BUILDING
70' BENCH (W/CHANNEL)
15' ROADWAY
35' PERIMETER BERM
30' PERIMETER BERM
15' BENCH
LANDFILL 1
LANDFILL 2
30' BENCH



D
C
B
A
N 66,930
N 67,330
N 67,730
N 66,130
N
340.0
332.0
334.0
45' BENCH
1.5H:1V
410.0
1% GRADE
2% GRADE
LANDFILL 1
15' BENCH
LANDFILL 1 - PROPOSED TOP OF CAP SURFACE ELEVATION CONTOURS (TYP)
PERIMETER BERM
30' PERIMETER BERM
30' BENCH
322.0
370
380
350


LANDFILL II - PROPOSED TOP OF CAP SURFACE ELEVATION CONTOURS (TYP)
LAND TREATMENT AREA
NOTES:
REFERENCE:
TOPOGRAPHY BY PHOTOGRAMMETRIC METHODS FROM AERIAL PHOTOGRAPHS
AUGUST 9, 1984.
VERTICAL DATUM: BASED ON EXISTING CONTROL.


LANDFILL 2
4.5% GRADE
LAND TREATMENT AREA
40' BENCH
PERIMETER BERM
10% G
LEGEND
PROPOSED SLIDING FENCE GATE
CONTOUR
10%
SCALE
0
100
200
300 FE



53' PERIMETER BERM
FILL AREA GRADED TO DRAIN
10% GRADE
BARBED WIRE FENCE
CHAIN LINK FENCE
PROPOSED SURFACE ELEVATION CONTOUR
STORMWATER DIVERSION CHANNEL
DIRECTION AND SLOPE OF GRADE
10%
370
SCALE
0
100
200
300 FEET
FRED C. HART ASSOCIATES, INC.
AS SHOWN
PROPOSED HAZARDOUS WASTE FACILITIES

BY MMT DATE 2/11/86	FRED C. HART ASSOCIATES, INC.	SHEET 3 OF 5	PAGE
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2) K is determined from Fig. 45
Assuming the soil cover is
60 % silt & very fine sand
30 % sand
3.5 % organic matter
Soil structure is fine granular
Permeability is moderate

$\therefore K = 0.33$

3) LS is determined from Fig. 46
for 3:1 slope (33%), 150' long

$\therefore LS = 6$

4) C is determined from Table 28
assuming

$\therefore C = 0.05$ (for new seeding in mulched soil) 1st year

5) P = 1.0 for worst case conditions

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FRED C. HART ASSOCIATES, INC.

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PAGE

SUBJECT Proteco

JOB NO. 8511

$$\therefore A = (44)(0.33)(6)(0.05)(1)$$

$$= 4.4 \text{ tons/acre/year}$$

According to Table 29 "Comparative Soil Loss", this value is acceptable

BY MMT DATE 2/11/86	FRED C. HART ASSOCIATES, INC.	SHEET 4 OF 5 PAGE
CHK'D ________ DATE ________		

SUBJECT Proteco JOB NO. [illegible]

FIGURE 45 and FIGURE 46

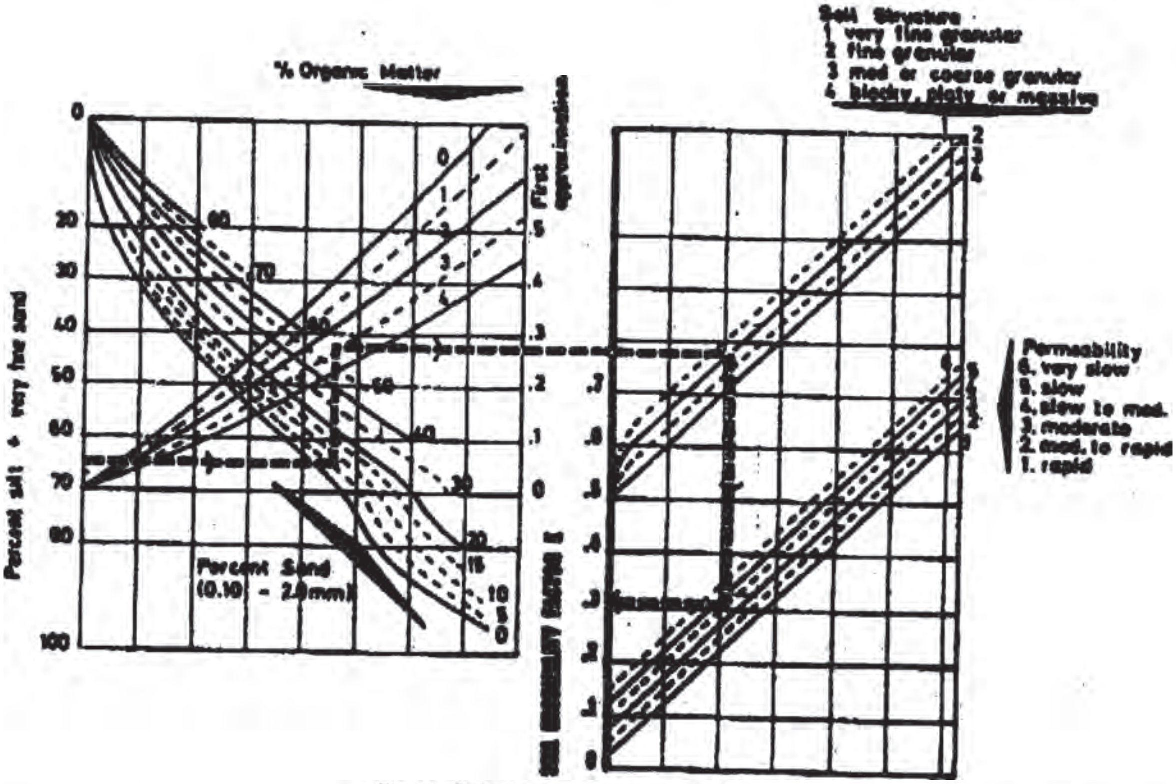

Figure 45. Soil erodibility nomograph.

Source: W. H. Wischmeir, ARS-SWC, Purdue University, February 1, 1971. First published in Journal of Soil and Water Conservation, with acknowledgments to the USDA Agricultural Research Service.

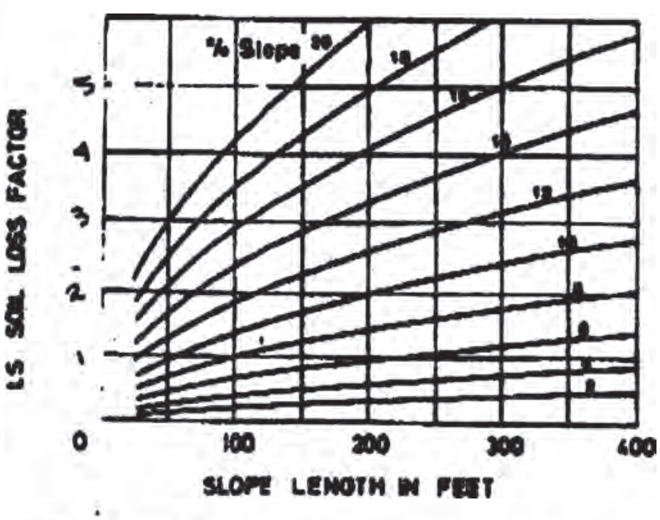

Figure 46. Curves for adjusting plot soil loss to length and steepness of slope.

Source: W. H. Wischmeir, ARS-SWC, Purdue University, February 1, 1971.

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CHK'D	DATE			

SUBJECT Proteco JOB NO. 3511

TABLE 28 and TABLE 29

TABLE 28

"C" Values for Mulching and Grasses

Mulch	
Very heavy 1500 to 2000#/acre	.10*
Heavy 1000 to 1500#/acre	.20
Moderate 500 to 1000#/acre	.40
Light 200 to 500#/acre	.60
Grasses	
Established	.01
New Seeding	
1st month	.60**
2nd month	.40
Remainder 1st year	.08

*Varies with type residue

**With seeding in mulched soil, use the lowest value of C for mulch or grass.

Source: "USDA-ARS Agriculture Handbook", No. 282, 1965, and "Soil Loss Prediction for Kentucky", USDA-SCS, 1984.

TABLE 29

Comparative Soil Loss

Loss (tons/acre/year)	Comments
0–5	Acceptable
5–20	Moderate (consider retention)
20–100	Poor (retention mandatory, consider changes in control practices)
100 and greater	Bad (radical changes in practice necessary)

BY MMT DATE 2/11/86	FRED C. HART ASSOCIATES, INC.	SHEET 1 OF 2 PAGE
CHK'D BMM DATE 2/12/86		

SUBJECT Proteco JOB NO. B511

Demonstrate the effectiveness of the drainage layer to remove water infiltrating cover:

1) Determine water infiltrating cover:

- for 25yr, 24 hr Storm direct rainfall = 10.5" *
- determine runoff depth, using Table 2-1* with rainfall depth and CN

CN is determined from Table 2.2* assuming Hydrologic Soil Group B (conservative estimate assumes moderate infiltration) and cultivated land without conservation treatment

CN = 81

∴ runoff depth = 8.13"

- infiltration = direct rainfall − runoff
  = 10.5" − 8.13"
  = 2.37"

* See Appendix D6-4, Section I

2) Transmissivity, T of drainage net is indicated in "Technical Specifications for Proposed Hazardous Waste Landfill and Surface Water Management Facilities"

$$T_{Net} = 3 \times 10^{-6}\ m^2/sec$$
$$= 4.65 \times 10^{-3}\ in^3/sec \text{ per inch of width}$$

3) Compare infiltration to transmissivity of drainage net.

assume 2.37" infiltration occurs in 12 hr time period (conservative) ∴

rate of infiltration = 5.50×10^{-5} in/sec

for 1' x 1' area:

volume of infiltration = $(5.5 \times 10^{-5}\ in/sec)(144\ in^2)$
$= 7.93 \times 10^{-3}\ in^3/sec$

volume removed by net = $(4.65 \times 10^{-3}\ in^3/sec/in)(12\ in)$
$= 5.58 \times 10^{-2}\ in^3/sec$

Vol. removed > vol. infiltration

∴ drainage net is satisfactory

BY MMT DATE 2/11/86 | FRED C. HART ASSOCIATES, INC. | SHEET 1 OF 1 PAGE

CHK'D BMW DATE 3/12/86

SUBJECT Proteco JOB NO. 3511

Demonstrate that the drainage layer of the proposed landfill cover design will not become clogged with fines:

Geotextile fabric will be used above the drainage net to prevent clogging with fines.

APPENDIX I.2

POST-CLOSURE INSPECTION FORM

POST-CLOSURE INSPECTION FORM

	Acceptable	Unacceptable
Cover		
Adequate vegetation	______	______
Integrity with respect to erosion	______	______
Subsidence	______	______
Stormwater Control System		
Integrity of berms	______	______
Accumulation of debris	______	______
Erosion and undermining	______	______
Leachate Collection and Detection System		
Condition and operations status of:		
• Manholes	______	______
• Sumps	______	______
• Pumps	______	______
• Valves	______	______
• Electrical system	______	______
Groundwater Monitoring Wells		
Locks	______	______
Access	______	______
Integrity of casing and soil plug	______	______

BY: ______________________

Date: ______________________

* Follow-Up on Unacceptable Items:

How Resolved	Date	By

(0573B)

APPENDIX I.3

NOTICE TO DEED/NOTICE TO LAND AUTHORITY

(0573B)

NOTICE TO DEED/NOTICE TO LAND AUTHORITY

Surveyed outlines for all applicable land areas will be supplied in the March 31, 1986 submittal.

(0573B)

APPENDIX I.4

LIST OF UNIT PRICES

LIST OF UNIT PRICES

	Item	Unit	($)
1.	Excavation and placement of clean soil	Cu yd	3.00
2.	Excavation and placement of contaminated soil	Cu yd	10.00
3.	Off-site disposal of waste (includes truck shipment up to 100 miles)	Cu yd	N.P.
4.	Stabilization of liquid waste	Gallon	0.46
5.	Sludge Stabilization	Cu yd	92.43
6.	Standard Cover	Sq yd	17.63
7.	Soil analysis (average price)	Each	260.00
8.	Water analysis (of washwater, average price)	Each	260.00
9.	Waste testing (for determination of stabilization requirements, applicant's price)	Each	550.00
10.	Decontamination of equipment	Lump Sum	800.00
11.	Engineer's certification	Lump Sum	500.00
12.	Spill absorbent (includes off-site disposal cost	Drum	75.00
13.	Cement kiln dust	Cu yd	15.90
14.	30 mil PVC liner (installed) 80 mil HDPE liner (installed)	Sq yd	4.00 8.00
15.	Filter fabric (installed) Drainage net	Sq yd	0.60 0.60
16.	Drainage material (in-place)	Cu yd	15.00
17.	Hydroseeding	Sq yd	0.23
18.	Operators (fully burdened)	Day	180.00
19.	Front end loader	Day	owned by facility
20.	Inspections (during post-closure)	Each	1,000.00
21.	Groundwater monitoring (for 25 wells, semi-annual sampling)	Each	50,000.00

(0573B)

APPENDIX I.5

FINAL COVER COST ESTIMATE

FINAL COVER COST ESTIMATE

The Final Cover consists of:

1 foot of soil (vegetated)
1 foot of protective cover material
Filter Fabric
Drainage Net
80 mil synthetic liner
2 feet of clay

For one square yard of cover, the quantities required and costs are as follows:

		Cost ($)
Seeding	1 yd^2 @ $0.23/$yd^2$	0.23
Soil for vegetation	0.33 yd^3 @ $3/$yd^3$	1.00
Protective Cover	0.33 yd^3 @ $1.53/$yd^3$	0.50
Filter Fabric	1 yd^2 @ $0.60/$yd^2$	0.60
Drainage Net	1 yd^2 @ $0.60/$yd^2$	0.60
80 mil Synthetic Liner	1 yd^2 @ $8.00/$yd^2$	8.00
2' Clay	0.67 yd^3 @ $10/$yd^3$	6.70
	TOTAL	17.63

NOTE: This represents a $1.20/$yd^2$ increase over the NOD valve.

(0573B)

Fred C. Hart Associates, Inc.